THE UNIVERSITY OF ALBERTA

A MODEL FOR AN INDUSTRIAL ARTS PROGRAM OF STUDIES FOR USE IN INDIAN EDUCATION

BY

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ABSTRACT

The purpose of this study was to develop a model for an industrial arts program of studies that might be used in Indian education.

The results of a research of the literature that was made as well as a review of related research studies showed little had been written on industrial arts for the Native learner.

The research instrument that was used with this study was a questionnaire which contained 25 questions divided into two major categories and consisted of background information and instructional organization.

Prior to the major investigation the research instrument was used in a pilot study. An industrial arts teacher who was teaching in a Native school was used for this phase of the study because of his availability, his knowledge of industrial arts, and his knowledge of the study.

The population for this study included the 33 industrial arts teachers who were teaching industrial arts in Indian schools across Canada.

Of the 33 instruments that were mailed to the participating schools, 24 instruments were returned for a 72.7 percent return. Ten of these instruments had to be discarded for a variety of reasons. The remaining 14 instruments were used to provide data for this study.

The findings from this study revealed that over 85 percent of the participants involved in the study were inadequately trained to teach industrial arts. The results of the study also showed that in the majority of the Indian schools involved in the research, the industrial

arts activities were limited because of the amount of space available. Other contributing factors that limited these industrial arts activities in participating schools were the inadequacy of the funds provided for the industrial arts program as well as minimum items of capital equipment that are needed to make industrial arts a meaningful program for the Native learner.

Another finding from this study was that the major activity in the industrial arts facilities of the participating schools was centred around woodworking. The findings also show that the organizational pattern for industrial arts for the majority of these schools was either a unit shop or a general shop.

As a result of the findings and conclusions of this study, a model for a program of studies in industrial arts for Native education was developed. The model included a philosophical statement, the broad aims and the general objectives for a program of studies in industrial arts for the Native learner.

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THE PROBLEM

Introduction

The role of industrial arts in education in the Western World and its relationship to academic education at the secondary school level has been well documented in the professional literature. However, there are limited sources of written material on the relationship of industrial arts and its role in Indian education in Canada.

The genesis of formal European-style education for the Indians of Canada had its roots with the advent of the first white missionaries and white settlers to this country. The missionaries, according to Harold Cardinal (1969, p. 53), saw the Indians as "savages, heathens or something worse" who needed to be Christianized to alter their way of living and the missionaries saw education as the most viable means to achieve that aim.

Education, per se, for the Indians of the Western Plains of Canada had its start with the arrival of Father Provencher, a Roman Catholic missionary, and two companions at the Red River Colony (now the Province of Manitoba) in July, 1818 (Philips, 1957, p. 152). The Protestant contribution to the education of the Indians had a perfunctory beginning in 1808, when the Hudson's Bay Company brought out three teachers to the Red River Colony. However, these teachers very quickly drifted into more exciting and lucrative forms of employment. The first real educational efforts for the Indian dates back to 1820 with the arrival, at the Red River Colony, of the Reverend John West, an ordained

clergyman of the Anglican church (Philips, 1957, p. 153).

When Confederation became a reailty in 1867, the federal government became responsible for Indian education. At that time the churches, both Roman Catholic and Protestant, had established schools in several areas across the plains to educate Indian children. Instruction in the schools was predominantly Christian in character, but also included the three R's and simple practical skills. According to Philips (1957, p. 337) the boys were taught basic skills in such areas as bookkeeping and agricultural crafts, and the girls were taught the rudiments of good housekeeping, spinning, needlecraft, together with dairy management. Although Philips did not define or describe the term "agricultural crafts", it is possible that these included some operations and procedures used to work materials found in industrial arts as it is known today. Although this possibility may have had existence in these early missionary schools, a model for an industrial arts program of studies for Native children was never developed for these schools.

For nearly a century after Confederation Indian students as a group did not respond to the efforts of the existing educational system sponsored by a white society, and subsequently the record of academic achievement for the Indian has been extremely low, and the failure rate of these students extremely high. A contributing factor stated by Hope McLean was "that the high failure rate was partially due to the inability of the Indian to identify his place in the educational system and the larger society (McLean, 1973, p. 129)." Emma LaRocque suggests that another contributing factor to the high failure rate in Indian schools appears to be the apparent lack of pride in the Indians' culture and

racial heritage. This author further points out that the public school systems across Canada have done little to dispel the myth surrounding the low esteem of the Indian, and as she states, "in many instances they (the public school system) have perpetuated stereotypes (LaRocque, 1975, p. 2)."

Another problem was that for years, until very recently, the Indian had no marketable skills that would afford him gainful employment in a complex technical society. In part, this could be attributed to the low achievement record of the Indian in school and the lack of adequate training opportunities whereby the Native learner could possibly acquire technical skills.

Although the Department of Indian and Northern Affairs has schools throughout Canada for the Native learner, some of these schools do have a program of studies in industrial arts. In most of these schools this program is a reflection of the curriculum of the province or territory where the school is located. This program reflects the predominantly white culture of the province or territory. A formalized research has never been completed that would develop a model for industrial arts for the Indian student.

Purpose of the Study

The purpose of this study was to design a model for an industrial arts program of studies that can be used in Indian education to make the Native learner aware of the technical society in which this learner lives.

Significance of the Study

The libraries are well stocked with books, pamphlets, research

reports and government publications which deal with the cultural history of the Indians of Canada. However, there is limited written documentation that pertains to industrial arts and its implications for the Indian learner or Indian education.

The significance of this study was to design a model for industrial arts that is relevant to the needs of the Native student, and that could possibly be a contributing factor in helping the Indian establish a self-identity in terms of Native culture and non-Native culture as well as find a place in the larger technical society of Canada.

It is hoped that the results of this study may be of value to personnel of the Department of Indian Affairs and Northern Development who are concerned with curriculum development and curriculum design that is relevant to Indian education, particularly as it applies to industrial arts. It may, also, be of value to those members of the Indian community who serve on the various school committees on the reserves, and who are now beginning to exert a more influential role in the current development of curriculum for Indian schools.

Definition of Terms

For the purpose of this study a number of terms will be employed and used throughout the report. The following definitions apply to the terms used throughout this study.

Indian

A person who pursuant to the Indian Act is registered as an Indian or is entitled to be registered as an Indian (Revised Statutes of Canada, 1952, Chapter 149, Section 2).

Indian Reserve

The areas of land set aside by the Crown which constitute the legal domain of the individual Indian Bands, and are set aside for their exclusive occupation, use and development (Revised Statutes of Canada, 1952, Chapter 149, Section 2).

Indian Band

The recognized community unit of Indian people living on a reserve or on a Crown land (Daniels, 1973, p. 7).

Indian Band Council

The representative elected council from the Indian community on an Indian Reserve that includes both the Chief and the councillors who are given the responsibility for managing the affairs of the Indian Band pursuant to the *Indian Act*.

Indian School Committee

The representative body of Indian people who are given the responsibility of managing all or part of the affairs affecting the education of Indian children from the Native community on the reserve. The School Committee may be appointed by the Band Council or it may be a committee elected at large and independently of the Band Council.

Native

The term "Native" will be used as a synonym for the term "Indian" as previously defined, although its usage by authors such as Chalmers, Gue and others infers reference to a broader group of people who may be Indian by birth or ancestry but cannot be classified as an Indian in accordance with the terms of the *Indian Act*.

Indian School

A school located on or near an Indian Reserve for the purpose of educating Indian children whose normal residence is on the Reserve.

Industrial Arts

The literature gives numerous definitions for the term "industrial arts". The definition found suitable for this study was the one by Feirer and Lindbeck (1964) which states, "industrial arts is the broad study of tools, machines, materials, equipment, processes, products, and occupations of industry, pursued for general educational purposes in the shops and laboratories of schools (p. 15)."

Limitations

The study had the following limitations:

1. It was limited to the model that was designed as a result of the research.

2. It was limited to a model for an industrial arts program of studies to meet the needs of the Indian student.

3. It was limited by the kinds of information that was furnished the researcher by other teachers who teach industrial arts in Indian schools across Canada.

4. The study was limited to those schools on Indian reserves that offer the program of studies in industrial arts for the Native learner. This limitation was included to make the study more manageable.

5. The study was also limited to the major technologies, found in the major industries, that are used to produce goods and services in western society.

Assumptions

The following basic assumptions were made for this study:

1. It was assumed that the industrial arts program of studies in Native schools located on Indian reserves would remain part of the curricula for these schools for the next two decades.

2. It was also assumed that other programs of studies that make up other curricula in Native schools would remain on the reserves for the next 20 years.

3. It was assumed that the Indian, because of his proximity to the predominant society, would like to join and become involved in the technology of that society.

DESIGN OF THE STUDY

Objectives

The major objective of this study was to develop a model for an industrial arts program of studies that could become an integrated part of the curricula offered in Native schools.

The study had the following supportive objectives:

1. To determine the tools, materials, and processes that should be part of an industrial arts program of studies for the Native learner.

2. To determine the kind of machine tools that should be purchased for an industrial arts program of studies that can be used with Native students to make these students aware of technology and its influence on society.

Population and Sample

The population of the study included teachers who were teaching

in Native schools in the 10 provinces and the two territories. This population was stratified into teachers who taught industrial arts and those teachers who taught subjects other than industrial arts. The former group of teachers were those who were involved in the study because of their close relationship with industrial arts.

Instrumentation for the Study

From a review of the literature that was related to Indian education as well as a review of the standard indices used to report research findings and from a search of a standard information retrieval service (Educational Resources Information Centre), it was found that no research studies had been reported or conducted that were directed at industrial arts for the Native learner. Because of this lack of formalized research, a model instrument was not found that could be used with this study. It was necessary for the researcher to design an instrument that was appropriate for the study.

To aid in designing the research instrument a review was made of the literature devoted to instrument design. From this review it was decided that a questionnaire should be used to collect data for this research.

Other purposes for reviewing the literature on instrument design were: for the researcher to learn the correct procedures used to phrase questions; for the researcher to learn how to sequence questions on the research instrument; for the researcher to learn to phrase questions that were minimal in ambiguity, and for the researcher to design questions that had both face and content validity.

Design of the Questionnaire

The research questionnaire that was designed for this study was modelled after the research instruments used by Schmidt (1966) and Dunne (1976) in their research. Schmidt (1966), in conducting a nationwide survey for the United States Office of Education on industrial arts offerings in American junior and senior high schools, used a questionnaire to collect data. This questionnaire had 19 questions that were categorized into the following pattern: school background information; industrial arts teacher background information; instructional activities background; industrial arts courses and industrial arts classes background information. More recently Dunne (1976) conducted a nationwide study in Canada on the pre-vocational, vocational and industrial arts programs offered in the residential schools for the hearing impaired students in Canada. Dunne, also, used a questionnaire to collect data. The questionnaire used by Dunne had 29 questions which were categorized as follows: school background information; instructor background information; hearing impaired education; program objectives; instructional activities; and curriculum information. From a synthesis of the research instruments of Schmidt and Dunne as well as information from the references on instrument design, a preliminary draft of questions that would make up the research questionnaire for this study was prepared.

The preliminary draft of the questionnaire was given to the major advisor of the study for review and comment. From this review there were a number of significant criticisms and comments that were made for the improvement of the research instrument. Both the criticisms and comments that were made were considered in the second draft of the instrument.

The instrument in its revised form was placed in the hands of a specialist in instrument design of the Department of Educational Psychology, the Faculty of Education of The University of Alberta. This reviewer stated that the questions of the instrument had face validity and that in its totality the instrument had content validity. It was also pointed out by this reviewer that, although the questionnaire was well organized, it would require a limited number of modifications. The modificiations suggested by this reviewer were incorporated into the research instrument and pertained to the rewording of one or two questions on organizational patterns as well as the addition of a question relating to the adequacy of current industrial arts programs in meeting the needs of the Native learner.

Pilot Study

A pilot study was conducted to pretest the research instrument before it was used in the major investigation. Because of the limited number of participants in the study from the industrial arts teacher sample, a teacher in industrial arts who taught in a Native school was asked to participate in this phase of the research. This participant was selected to be involved in the pilot study because he was aware of the study and because he was readily available. This individual was also involved as a participant in the major investigation.

The pilot study had the following purposes: to determine if each statement was properly and adequately worded; to determine if questions were properly sequenced; to determine if questions would yield relevant data for the study; to determine the amount of time it would take a participant to complete all the questions of the instrument. The

results of the pilot study showed that a number of questions on the instrument would have to be rephrased. On the final draft of the research questionnaire, these questions were rewritten. Appendix E, page 145 contains a copy of the research instrument.

Methodology

The following methodology was used in conducting the study.

Correspondence was initiated with Dr. E. R. Daniels, Chief, Education and Cultural Development Branch, Department of Indian Affairs and Northern Development, Ottawa, Ontario. The purpose of this letter was to request that Dr. Daniels cooperate in the research by furnishing the researcher with a list of school administrators who administer schools located on Indian reserves across Canada that offered a program of studies in industrial arts. A copy of this letter makes up Appendix A, page 136.

The requested cooperation was readily granted and the researcher received a list of all the Regional Directors with the Department of Indian Affairs and Northern Development across Canada. The researcher was also granted permission to contact each Regional Director to obtain the information necessary for the study. This list of Regional Directors is part of Appendix B, page 138.

A letter was prepared and mailed to each Regional Director asking him to cooperate in the research by supplying the researcher with a list of names of administrators and/or schools in their respective regions that offered a program of studies in industrial arts as part of their course offerings. The Regional Directors cooperated in the study by sending the requested information. In their replies to the researcher

the Regional Director from the Province of Ontario and the Regional Director from the Northwest Territories advised the researcher they were unable to be of assistance in the study since there were no Indian schools in their respective jurisdictions that offered courses in industrial arts. Following identification of those schools that offer a program of studies in industrial arts, a letter was prepared and mailed to each school principal that offered either a course or courses in industrial arts. The content of this letter briefly described the study and asked the principal to grant permission to involve the industrial arts teacher(s) of a particular school in the study. Enclosed with the letter was a research instrument and a self-addressed stamped envelope. Each industrial arts teacher who participated in the study was asked to return the completed questionnaire to the researcher in a self-addressed stamped envelope by the deadline that was established. A copy of this letter can be found in Appendix C, page 141.

Of the 33 letters that were mailed, 15 instruments were returned. These represented a return of 44 percent. To increase the percentage of return, a follow-up letter was prepared for delinquent participants. The follow-up letter, a questionnaire, and a self-addressed stamped envelope were mailed to those participants who did not return a completed instrument.

This procedure yielded an additional nine instruments. Of the 24 instruments that were returned, only 14 were usable. The remaining 10 instruments could not be used in the study for the following reasons: one school lost the industrial arts teacher who resigned and the program had to be suspended; in five schools the industrial arts studies were no

longer offered at this time because the schools were in the midst of a rebuilding program; and there were four schools which no longer offered industrial arts to their students.

Chapter 2

REVIEW OF THE LITERATURE

Chapter 1 presented all phases of the research design for this study as well as a listing of definitions for the terms that will be used throughout the report.

Chapter 2 is divided into three major sections: The first section is an historical overview of Indian education to ascertain what authors or publications, written on Indian education, may have written about industrial arts for the Native learner. This section of the chapter is organized into three parts, pre-Confederation, Confederation to the end of World War II, and the period from the end of World War II to the present.

The second part of this chapter is directed at the works of specialists in the field of curriculum design and curriculum development. The textbooks written by these specialists were reviewed to determine the major components of a curriculum.

The third and last part of this chapter centres about the theme of identifying the major components for a curriculum model for an industrial arts program of studies for the Native learner.

PRE-CONFEDERATION

Patterns of the Past

Prior to the advent of the white man into the world of the Indian, the Indian had an informal system of education. This system of education had no written objectives that could be clearly articulated to

meet a specific learning situation, rather it functioned within an informal framework. If the child was a male he was taught the rudimentary skills of hunting, fishing, becoming a warrior or a medicineman. The girls were taught how to be good wives and mothers. The Indian method of education according to Harold Cardinal (1969), "was designed to prepare a child for whatever way of life he was to lead - hunter, fisherman, warrior, chief, medicineman, or wife and mother (p. 52)."

The Algonkian Tribe of Eastern Canada, for instance, was nomadic and since there were no schools or any type of formal education for this tribe, the young Indian child acquired an education by observing nature and by making and practising the things he would be required to do in later life. Jenness (1932), in the following quotation, described the type of practical education that the children of both sexes acquired:

> The boys made bows and arrows, canoes, toboggans, and they played at hunting and fishing. The little girls, as part of their play, learned to sew, to cook, to make bark vessels, and to embroider skin and bark with moose-hair or porcupine quills. (p. 22)

Carr (1968) did a study of the educational processes of the early Blackfoot Indian culture of the western plains. In discussing the manual skills that were developed in that system of education, he wrote:

> Most Blackfoot men and women possessed a great deal of manual skills . . . the above were crafts [basketry, leatherwork, craft such as dressing, tanning, smoking, sewing, and decorating. Inserted by researcher] the Blackfoot youth acquired training in as they became members of their social group. The fact that an individual might go on to become recognized as a specialist in a particular area was based on his interest and ability in that line of endeavour. (p. 122)

Carr described the development of basic skills that were practised by the Blackfoot Indians prior to Confederation. Although Carr did not identify these crafts as manual arts, the forerunner of

industrial arts, it would appear that these crafts were used to shape the future of the young Indian in his or her progression to becoming a contributing Elder of the tribe.

Jenness (1932) observed that the Indian child was accorded a considerable degree of freedom both in the home and the process after acquiring a practical education. This freedom went hand-in-hand with the system of Native education even though formal schools were non-existent. In writing about the education of western bands of Indians, Jenness describes two types of informal curricula that were used. It is evident from what this author wrote that these curricula were secular and ethical and religious:

> The western bands of Carrier Indians who had absorbed much of the culture of the coastal tribes in British Columbia recognized two curricula: one secular and the other ethical and religious. The secular course was our manual training--instruction given at no set hours in the various tasks the children would have to perform in later years. (p. 152)

Chalmers (1970), in his book "Education Behind the Buckskin Curtain," implied that the education of the Indian child, whether formal or informal, had been shaped by two types of objectives. The first of these objectives were those of the child (or more likely the child's parents) and the second set of objectives were those of the society in which the child grew up. This author noted that "these societal (Indian society) objectives are that the pupil becomes a social being, contributing economically and otherwise to the society in which he is being reared (p. 1)." It is interesting to note the observations that Ruth Benedict (1934) made with reference to shaping of the Indian child in a Native society:

> The life history of the individual is first and foremost an accommodation of the patterns and standards traditionally handed down in his (Indian) community. From the moment of his birth the customs into which he is born shape his experience and behaviour. By the time he can talk he is the little creature of his culture, and by the time he is grown and able to take part in its activities, its habits are his habits, its beliefs his beliefs, its impossibilities his impossibilities. (p. 2)

The literature on Indian societies prior to the pre-white man era infers that these societies had an intricately-structured informal educational system. Although the various Indian societies or tribes differed greatly in their organizational structure and culture, there were similarities in the educational processes that each used to prepare the children of the tribe for his future within the tribe. In general, the Native children were instructed in such pursuits as hunting, fishing, handicraft, agriculture, and housework. They were given training in speech, customs, social responsibilities, tribal ancestry and social etiquette. The children, while very young, played at the serious business of the things they would be required to perform when they became of age - the girls attending to the household duties and boys following the men's pursuits (Jenness, 1932).

In spite of the vast differences between the various tribal customs and cultures, the Indian child grew up in a highly organized society and the child had to learn his role in it as well as learn how he must function as an individual (Chalmers, 1970, p. 3).

The Intrusion of the White Man Into The Native Society

On July 24, 1534, Jacques Cartier landed on the shores of Gaspé Basin and the Cartier landing probably marked the first recorded encounter that the Indian in Canada had with the white man (Woodley, 1946,

p. 14). However, it would appear that the opening of the doors for the entrance of the white man into the Indian's world occurred much later when Samuel Champlain, in 1603, sailed up the St. Lawrence River to Tadoussac where he agreed to support the Algonkian Indians in their defence against the aggressive Iroquois (Jenness, 1932, p. 1).

The first encounter that the Indian had with the educational system of the white man was through the Jesuits of the Roman Catholic Church. According to Philips (1957) the first Jesuit arrived in Acadia in 1604 but his stay was of a short duration. It was not until 1611, when two Jesuit priests, Fathers Pierre Briard and Enemond Massé, arrived at Port Royal that a serious endeavour was made to educate Indian children (Chalmers, 1970, p. 25). The primary objectives of the Jesuit educators were "the aim of the Roman Catholic Church: to ensure the salvation of souls of as many Indians as could be reached and of all the colonist if possible" (Philips, 1957, p. 4).

Those early Jesuits were handicapped in many ways because as Chalmers (1970) pointed out they were deficient in verbal communicating skills with the Indian learner. On this issue Chalmers wrote:

> The difficulties they encountered in attempts to teach the Indians were formidable. Not only were the newcomers ignorant of the native language, they had neither dictionaries nor grammars to assist them in mastering the aboriginal tongue. Further, the native vernaculars were singularly deficient in abstract terms of words of religious significance. (p. 25)

Those early endeavours by the Jesuits to educate the Indian children were terminated some two years after it began when the new colony that was established on Mt. Deseret Island was attacked by Sir Sam Argall of the British Virginia Company. The Jesuits, who narrowly escaped being hanged as pirates, were shipped back to their native

France (Chalmers, 1970, p. 26).

A more promising endeavour in Native education was carried out in 1615 by the Franciscan Order of the Recollets when they established the first permanent mission in Quebec (they were later joined by the Jesuits). Probably the first schools for Indian children were established by Father Pacifique at Three Rivers in 1616 and Father Le Caron at Tadoussac in 1618 (Philips, 1957, p. 4).

The work of the Recollets and the Jesuits as educationists came to an abrupt stop in 1629 when the English led by David Kirke captured Quebec. Kirke subsequently expelled both the Recollets and the Jesuits from the French colony (Marquis, 1922). When the colony was returned to the French in 1632, only the Jesuits were allowed to return.

In writing about the Jesuit educational endeavours among the Natives during the period of 1611 to 1658, Gibson (1939) summarized the educational achievement of both religious orders for these four decades as follows:

> The Jesuits, on their part, had acquired a knowledge of the inhabitants and their language. They had won over and converted influential tribesmen and had established a special colony with Jesuits in sole charge. The achievements of the Franciscan Recollets were more tangible and specific. They had made definite efforts to teach the alphabet, reading, writing, and had compiled the first dictionary of the Indian language of the region. They had founded the first educational institutions, a seminary, and four sedentary missions in the neighbourhood of Quebec, and had established a novitiate at Quebec. Last, but not least, they had invited the Jesuits, on whose shoulders was to fall the real educational work in New France, to aid them. (p. 12)

According to Chalmers (1970) the Jesuits were considered to be the first vocational teachers in New France, where they established five specialized schools for the purpose of teaching mathematics, marine

navigation, as well as arts and crafts which included sculpturing and wood-carving. Although these schools were designed primarily for the children of the white settlers, Native children did attend them (p. 30).

The French missionary endeavour, especially those of the Jesuits, came to a conclusion in 1759-60 with the fall of New France to the British. The primary reason for this termination of activities was that the supply of missionaries from France was cut off, and it was not until some 80 years later that the Oblates of Mary Immaculate came to Canada and eventually developed a monopoly of the education of Roman Catholic Indian children.

Indian education after the arrival of the white man originated as a Christian obligation that was assumed by the church. However, in later years, the responsibility for Native education was given to the federal government. All early educational endeavours for Native children was missionary in character, and for nearly 200 years this work was carried on with little or no financial assistance from either the federal or provincial governments.

Jobin (1947) conducted a study on the education of the Indians of Western Ontario. In this study the author noted that "the first school in Upper Canada (1784) was for Mohawk Indians who had settled on the shores of the Bay of Quinte (p. 15)."

After the fall of New France the missionary activity in Native education was intermittent, and it was not until the beginning of the 19th century that a more organized effort, oriented toward Native education, began to emerge. A few years prior to the turn of the 19th century an American Revolution had just completed and many of the colonists still loyal to the Crown fled to Canada, and were known as the United

Empire Loyalists. Among this group of Loyalists was the New England Company, a philanthropic organization, whose primary purpose was to improve the conditions of the Native people. The principle objectives of this company were: to educate the Native people in the English language, train them in a practical vocation and Christianize them in the Protestant faith (Chalmers, 1970, p. 37). The first endeavours of the New England Company in Canada was among the Micmacs in New Brunswick. The plan of the company was to establish schools in selected communities with the hope that they could entice the Indian parents to surrender their children to the school. According to Chalmers (1970) this plan never succeeded because of the migratory patterns of the parents, as well as the distrust of the local company commissioner by the Native parents. The company later established a boarding school for 40 Indian students of both sexes. The plan of this school was to educate these students at the school until they reached the age of seven when they would be indentured to a white family to serve an apprenticeship in conjunction with their schooling. The rapacity and immorality of the white settlers toward the Native helped destroy the effectiveness of the plan, and after a few years the plan was abandoned (Chalmers, 1970, p. 40).

Native Education in the Western Provinces

The region of Canada that now constitutes the four western provinces has had a relatively short history under European settlers before a system of public education was established. However, it was not until after the second decade of the 19th century that the church became the principal agent for education among the Natives of the western plains. This educational endeavour began with the arrival of Father Provencher

at the Red River Colony in 1818 (Chalmers, 1970, p. 58). Provencher was joined later by the Oblates and the Grey Nuns from Montreal. The Protestant contribution to the education of the Natives of the western plains began with the arrival at the Red River Colony of an Anglican clergyman by the name of John West, who arrived in 1820 (Philips, 1957, p. 153).

From the Red River Colony the missionaries made their thrust west and wherever they went their prime goal was to establish schools for Native children. The establishment of these schools by the early missionaries was difficult due to the nomadic nature of the Indian. However, when the buffalo was swept from the plains, the Indian became more dependent upon the white man for survival. It was for this reason that the Native reluctantly accepted the white man's churches and education (Chalmers, 1970, p. 137).

Jobin (1947) summarized the educational activities for Indian children by quoting from a report issued in 1867 by the federal department responsible for Indian affairs. In part, Jobin summarized the educational activities of Native children in the following manner:

> Prior to Confederation, day schools were successfully conducted at Lorette, St. Regis, and Pierreville in Lower Canada. At Caughnawaga, educational work was made nearly impossible by local difficulties. However, there were interesting experiments at Chateauguay and Christieville, where Indian boys from Caughnawaga were taken into residence and given training in the classroom and on the farm. All these school activities received grants from Lower Canada. The Seminary of St. Sulpice at Oka maintained a farm school, at which Indian boys enrolled.
>
> In Upper Canada, the Society for the Propagation of the Gospel in Foreign Parts organized the earliest Indian school on the Tyendinaga Reserve (Bay of Quinte). The New England Company, an evangelical organization chartered in 1661 in the reign of Charles II, the Wesleyan Methodist Missionary Society, and the Jesuits interested themselves in Indian educational work early in the 19th century. Approximately 40 day schools were

> established in Upper Canada prior to Confederation, but there is record of only two of them receiving grants from the government of the day. Special institutions for the education of Indians were established at this time; the Mohawk Institute by the New England Company; the Alderville and Mt. Elgin Boarding Schools by the Wesleyan Methodist Missionary Society, and the Mikwemikong Boarding School by the Jesuits. In addition there was a community training centre established by the Governor of Upper Canada at Manitowaning, on Manitoulin Island. This enterprise was for the education of both young and old; but, as it did not appeal to the Indian temprement, it was abandoned in 1856, after 20 years of effort . . . Prior to Confederation there was practically no organization of Indian Schools in other parts of Canada. Missionaries interested in the education of Indian children were opportunists--classes being conducted whenever and wherever the activity gave promise of even a little success. The New England Company experimented with foster homes for Indian children in New Brunswick even before it applied its energy and funds to the work among the Six Nations. A Church of England chaplain to the Hudson's Bay Company conducted a boarding school for Indian children on the Red River as early as 1822. A Roman Catholic priest tried an agricultural school for young Indians at Baie St. Paul, now St. Eustache, Manitoba, in 1833. There is record of day schools in various parts of the west, all conducted by Roman Catholic, Church of England, and Methodist missionaries. (p. 15)

When the first white settlers and missionaries arrived in Canada, they brought with them strange customs and value systems, and when these customs and values were injected into the Indian's way of life it upset the Indian's social system. It is the view of Cardinal (1969) that "the missionaries, in particular, introduced two critically important institutions--religion and formal education. The introduction of these institutions to the Indians heralded a new era, drastically changing the old way of life (p. 52)." The author suggests that educational goals of the missionaries were very seldom achieved mainly because the goals for education that were established by these newcomers were not those of the Indian. Cardinal addresses this issue when he wrote:

> The unwarranted truth is that the missionaries of all Christian sects regarded the Indian as savages, heathens or something even worse. They made no attempt to appreciate Indian cultural values

> and paid little heed to Indian ways. The true purpose of the schools they established was to process good little Christian boys and girls--but only Christians of the sect operating the school. (p. 53)

With the passing of time more and more land was being settled by the white man which precipitated another goal for Indian education--the assimilation of Native people into the white society. In 1972 Hope McLean reviewed Indian education in North America. From this review McLean pointed out that attempts to assimilate the Indian into a white society by educating them in integrated schools met with little success in Upper Canada. Elaborating on this point McLean noted that:

> In 1850 the character of the white communities living near Indian communities was so prejudicial to any positive gains on the part of the Indians that Sir Francis Bond Head, Lieutenant Governor of Upper Canada, counselled complete segregation "to fortify them as much as possible against all communications with whites." For the next hundred years, the education of Indian children was segregated and protective. The main course of study in both industrial and residential schools was industrial to prepare the Indians for a life of piety and industry. (p. 102)

CONFEDERATION TO THE END OF WORLD WAR II

Responsibility for Education

With the passage of the British North America Act in 1867, and by the provisions of Section 91 (24) of this Act, the federal government assumed legislative jurisdiction over the Indians and any lands reserved for the Indians (Cummings and Micken, 1972, p. 72). In assuming legislative responsibility for the Indians the federal government was placed "in a rather anomalous position (Chalmers, 1970, p. 39)," as this responsibility included education, a control otherwise vested in the provinces through the provisions of the British North America Act.

When the federal government took on the responsibility for Indian education the government had no cadre of professional educators to develop and implement an educational program for the Natives, since education was a provincial responsibility. Chalmers (1970) took the position that the primary objective of the government after Confederation was Christianizing the Indians, or at least eliminating what the government considered to be pagan practices (p. 160). The basic objectives of the federal government for Indian education were in harmony with those of the church operated schools that were in existence at that time. It was a logical decision for the federal government to allow the churches to continue the role of educator for Native children. When this occurred there was little change in the curriculum, and the process of educating the Native children followed a pattern that was established prior to Confederation--a pattern that was to exist for nearly a century.

At Confederation the majority of Indian schools that were in existence at that time were supported either by a religious body or a missionary society, with little or no financial assistance provided by the existing governments in support of education. The British North America Act placed the education of Indians under federal jurisdiction and reports from Indian schools that were recognized by the federal government were submitted to the federal office which administered Indian affairs. According to Philips (1957), "at the time of Confederation the Indian Office recognized only 50 schools for Indians, all in Ontario and Quebec, and all day schools except the establishment at Mount Elgin (p. 327)." The school at Mount Elgin was a Methodist sponsored residential school for Indians established in 1849.

Curriculum in Church Sponsored Schools

In the church sponsored schools the curriculum included instruction in the Christian faith, the three R's as well as some practical skills. Agricultural skills and crafts were taught to the boys and household chores to the girls (Philips, 1957, p. 337). The purpose of these schools was to prepare the Indian child for adulthood, and to assist the child in developing skills that would relate to the environment in which the Native learner would function after leaving school. From what has been written about this period, it would appear that the crafts that were taught had inferences for industrial arts and that these crafts were present not only in the education of the Native student prior to the coming of the white man but also in the curriculum of the church operated schools before and after Confederation. There also appears to be a parallel in the objectives of those early school craft programs and the objectives that relate to contemporary industrial arts programs--preparing the child for the society that he will enter as an adult.

Government Involvement in Indian Education

Although provincial and territorial governments were involved with Native education prior to Confederation, the British North America Act (1867) placed the responsibility for Indian education under the jurisdiction of the federal government. Daniels (1973), in a study of the legal context of Indian education in Canada, discussed the education of Native children in Upper Canada which recommended that the Anglican church and the federal government operate Indian schools. According to Daniels in the 1845 government report to the Legislative Assembly of Upper Canada, it was:

> recommended the adoption of a system of industrial boarding schools for Indian pupils, a system which received the enthusiastic support of the Anglican Bishop of Toronto and many of his missionaries. In 1847, the former young missionary at the Credit River School, now Dr. Ryerson and Chief Superintendent of Education for Upper Canada, issued a further report outlining in specific terms how these institutions should be run. He advocated a joint church-government operation, since 'with (the Indians) nothing can be done to improve or elevate his character and condition without the aid of religious feeling.' At the same time, he suggested the government take the responsibility for the inspection of the schools, the issuance of general regulations of the operation and, of course, contribute toward their general maintenance and operation. Arising out of these two reports, the first two Indian industrial schools were established. (p. 64)

Development of the Department of Indian Affairs

In 1873, the Indian Affairs Branch of the federal government was established, although enabling legislation, the Indian Act, was not passed by Parliament until 1876. From its inception the Indian Affairs Branch has experienced several transitional periods where there was either a change in the name of the department or a change in the location of the federal department in which it functioned. Until 1880, it was known as the Indian Department. In May, 1880, the name of the department was changed to the Department of Indian Affairs. In December, 1936, the name of the Department of Indian Affairs was changed to the Indian Affairs Branch. The last time that the name was changed was in January, 1966, when it became known as the Department of Indian Affairs and Northern Development (Daniels, 1973).

Treaties

The federal government, in 1871, entered into the first of the numbered treaties with the Indians on the western plains. A total of 11 treaties was signed; the last one being signed in 1921. In negotiating

the earlier treaties the federal government assumed responsibility for not only native education but the health and other services of the Canadian Indian. The commitments of these treaties to Indian education were rather vague and as Daniels (1973) pointed out the federal government was "to maintain a school-house on reserves when the Indians desired and were ready for it (p. 94)."

The numbered treaties negotiated by the federal government with the Western Indians were not the first treaties the government entered into with the Indian. That honour, wrote Chalmers (1970), "belongs to one signed by Selkirk at Red River on July 18, 1817, and by representatives of Cree, Assiniboine (Stony), Chippewa (Ojibway or Saulteaux), and other bands (p. 141)."

At the time these treaties were negotiated,

> It is certain that the Indians believed, and probably that the federal government authorities intended that the treaties would forever guarantee the economic and cultural integrity and survival of the Indians. But they proved to be broken reeds. In the past century they have been abrogated in both letter and spirit (Chalmers, 1970, p. 143).

Cardinal (1969) considered these treaties a swindle. This noted Native author wrote:

> The Indian leaders who signed our treaties with the representatives of the government of Canada came to the signatory negotiations and meetings with honourable intent and laudable purpose. Their gravest mistake was to give the white man the benefit of the doubt and attribute to him the same high principles. He didn't have them. He, the white man, talked one way and wrote another. (p. 39)

The Indian Act

The first *Indian Act* was passed by Parliament in 1876, and like the treaties, the Act was vague in its commitment to Indian education.

In 1880, the Indian Act of 1876 was extended to give the Chiefs or Chiefs in Council the authority to make rules and regulations concerning the education of Indian children as well as other matters. This authority was extended in 1884 by an amendment to the Act to include rules concerning the attendance at school of Indian children between the ages of six and 15. In 1894, the Indian Act of 1876 was amended to include a legal provision for schools on the reserves. However, the legal context of the amendment limited the federal responsibility to residential institutions only. Day schools for Native children were apparently considered the responsibility of the Native community, although in actual practice, this responsibility was exercised by the sponsoring church body or missionary society (Chalmers, 1970, p. 150). When the Indian Act was amended in 1906, for the first time a specific heading of "schools" was included (Daniels, 1973, p. 99).

Additional amendments to the Act that had an affect on education continued to be made until 1933. These amendments were of a minor administrative nature. After 1933, no changes relative to education were included in the Act until 1951, when the Indian Act was repealed and it was replaced with the new Indian Act of 1951.

THE END OF WORLD WAR II TO THE PRESENT

With the passage of the British North America Act, the federal government was given jurisdiction over Indian education. But, as Chalmers (1970) noted:

> The federal government inherited little in the way of an Indian educational program and had few legislative precedents to help it. And since education was a provincial responsibility, it had absolutely no cadre of professional personnel to develop and implement such a program. (p. 140)

Because of this lack of trained personnel to implement an educational program, it was logical that the government would allow the Christian churches to continue to supply the educational services to Native learners that existed prior to Confederation.

The Indian Act of 1876, as well as the subsequent amendments prior to 1951, was noted for its silence on school matters such as school construction, hiring of teachers, and curricular content. "Perhaps the silences," said Gue (1974), "can be interpreted as the tacit approval of the operation of Indian educational services by Christian churches (p. 10)."

After the conclusion of World War II there was an awareness of the problems related to Canada's Native population, problems that included education. The result of this awareness was the formation in 1946 of the Joint Parliamentary Committee to look into the problems that were related to the Indians.

The reasons for these changed attitudes of the federal government toward Native education are speculative. However, it is worthy to note an observation made by Bullen (1968) in the following statement:

> In 1946, when the Joint Parliamentary Committee was formed in Ottawa to look into the problems of Indian education, the majority of Canadian citizens were ready it seems, for the first time, both emotionally and intellectually, to reject the unconscious apartheidism of pre-war years. The years between 1931 and 1945 had obviously brought about changes regarding attitudes toward Indians. Each reader may speculate on the causes of these changed attitudes according to his or her reading of the history of those years. Perhaps the rise and fall of Nazi ideology had something to do with it. Perhaps stirring among the Indians themselves were coming to the notice of Canadians, jarring many out of their indifferences and complacency. Perhaps the growth across the country of the number and type of linkage between Indians and whites was causing more concern. (p. 183)

The Indian Act of 1951

After an extensive review of the entire Indian situation in Canada by the Special Joint Committee of the Senate and the House of Commons, and the subsequent findings of this committee, the Indian Act of 1951 became law.

The new Act, although brief, was more specific in its commitment to the education of Native children. Daniels (1973) described not only the brevity of the Act but briefly discussed some of the major areas that were referred to in the Act relevant to Indian education:

> In this new Act, the section pertaining to education covered the areas of (a) operation of schools both on and off the reserves, (b) attendance, truancy and penalties for truancy, and (c) separate schools and religious denomination of teachers. When one considers that these topics are all covered in ten brief sections, including one devoted merely to the definition of terms appearing in the other nine sections, and compare this to the size of the respective Acts covering Provincial educational provisions, the conclusions could be reached that either the education of Indian children is an undertaking calling for a more simplified approach or that the education of other children is overly prescribed. (p. 105)

Although the Act was considered by many to be a step in the right direction, it was also noted for its manifold omissions regarding the specifics of Native education, specifics which give any educational program substance and direction.

These omissions were pointed out by Chalmers (1970) when he listed them thusly:

> The erection, alteration, and dissolution of school districts, the qualifications, appointments and powers of school teachers, the authorization of curricula including the selection and purchase of text and library books, the liability of school personnel, the capital and operational financing of schools, the conveyance of pupils on and off the reserves, the days and hours of school operation. (p. 152)

This Act, like the previous Indian Act, had one predominant

omission which was the silence of the Act on any provisions which would have given direct control and involvement in school matters to the Indians.

Signs of federal government involvement in Indian education began to emerge prior to the passage of the Indian Act of 1951. In 1949, personnel teaching in Indian schools were placed on the payroll of the Department of Indian Affairs although these teachers continued to operate under the jurisdiction of the church administrators who generally operated these schools. It would appear that this move on the part of the federal government was the beginning of the dissolution of the partnership that previously existed between the church and the government. This occurred slowly within the following two decades.

Integration or Assimilation

The Indian Act of 1952 included in it provisions which allowed the Minister responsible for Indian Affairs to enter into agreements with provincial or other educational agencies for the education of Indian children at institutions that were located off the reserve. These other educational agencies included such agencies as public or separate school boards, and religious or charitable organizations (Indian Act, Revised Statutes of Canada, 1952, Chapter 149, Section 114).

Through the provisions of this Act it was now possible for Indian children to attend non-Indian educational institutions. One could interpret this as a move by the federal government towards (a) integrating Indian children into a non-Indian school environment and subsequently into the predominantly white society, and (b) the first step towards loosening the influence of the church on Native education.

According to Daniels (1973, p. 113), the British Columbia Legislature in 1949 gave authority to the Minister of Education to enter into an agreement with the Department of Indian Affairs which would make it possible for Indian children to attend public schools away from the reserve. This author also noted that other provincial agencies since 1951 had entered into similar agreements with the federal government regarding the attendance of Indian children at public or non-Indian schools.

The New Indian Act and Industrial Arts

From previous discussions it is rather apparent that all Indian Acts and the subsequent amendments prior to 1951 were rather vague if not silent on the role of industrial arts in Native education. It was noted previously that even prior to Confederation, Indian schools functioned under the auspices of the Christian churches who offered instruction in practical programs involving manipulative skills, and even though these programs were never identified as industrial arts, it would appear that its inferences were present.

In a personal interview with Dr. Chalmers (1976), he suggested that practical programs of an industrial arts nature offered in Indian schools were limited to the equipment and materials available as well as the expertise of the instructor, which in most schools was minimal. It would appear that the church related schools operated on a minimum budget, with the result that student exposure to some form of industrial arts was limited to one or two areas--usually woodwork or some form of craft such as bead work or leathercraft.

When Indian children started attending public schools off the

the reserve they invariably were exposed to industrial arts programs structured in accordance with the existing provincial curriculum. That exposure, of course, was limited only to those schools where an industrial arts program was available since budgetary limitations precluded industrial arts as part of the school curriculum in many schools.

The Impetus of Technology and the Indian

With the advent of the 1950's, the impetus of mass media in the form of radio, television, and other forms of mass communications were starting to impact on the sanctity of life on the reserve. One of the findings of the Senate-Commons hearings in the late 1940's into the Indian problem suggested that the 19th century concept of life on the reserve was not in harmony with the inroads of a 20th century technology on the life of the Native. Ferrari (1973) in discussing the assimilation of the Canadian Indian into an urban predominantly white society wrote the following:

> The enticing glitter of white civilization had made its presence felt on the reserve especially since the end of World War II and resulted in a tendency to migration by Indians toward the periphery of Canadian city-life. By the end of 1964, it was estimated that about 15% (32,000) of registered Indians were living off the reserve, and generally in underprivileged conditions. Yet it would appear that the Indian is doubly disadvantaged in the modern city. Not only is he removed from his familiar native environment, but he is living in the midst of whites to whom his habitat by very definition can be nowhere else but on the reserve. He therefore becomes a living paradox, incapable of being assimilated into urban life. (p. 25)

After 1951, there was a tendency on the part of the Department of Indian Affairs to place more Indian children in non-Indian schools that were located off the reserve. This move could have been construed as a response to the realities of a new technical society and a change

in the attitudes of the white society toward the Indian as an individual. The Department of Indian Affairs began to question its wisdom of segregating the Indian on the reserve and away from the main stream of Canadian society. Ferrari (1973) provided statistics on the number of Indian children who were placed in off-reservation schools. These statistics show that between 1948-49 and 1968-69 the number of Indians enrolled in vocational schools and universities continued to grow.

> By the academic year 1960-1961, there were, some 11,000 Indian children so placed. This stood at 25,000 for 1964-1965 session and by the 1968-1969 year had reached 33,000 or about 15% of the Indian school children. . . . Along with these developments there has been a growing enrolment of Indians in vocation schools and universities of Canada, as the following table indicates:

INDIANS ENROLLED IN VOCATIONAL SCHOOLS & UNIVERSITIES

Year	Vocational Schools	Universities
1948-49	41	9
1961-62	422	50
1964-65	1,083	88
1968-69	1,528	235

(p. 26)

Although there was an increase of Natives in attendance at universities or technical institutes, they constituted less than 1% of the Indian population. By 1960, the Indian was granted the franchise to vote in federal elections; subsequently, this franchise was extended to provincial elections as well. After 1966, the provinces repealed existing legislation that prohibited the Indian from consuming alcoholic liquors. The granting of these privileges and rights to the Indian would appear to be token steps toward autonomy for the Native people.

A New Indian Policy

It was pointed out previously that after Confederation the prime

objectives of the federal government toward the Indian was to Christianize the Indian or at least to eliminate what personnel of the federal government considered to be unacceptable pagan practices, and to permit the Christian churches to continue in their educational role that they had assumed prior to Confederation.

In the early 1960's changes began to emerge in the educational patterns as the Department of Indian Affairs began to exert a more dominant role in formulating policies for Indian education. Chalmers (1970) stated that "the most important development in Canadian Native education during the Sixties was the integration of Indian children into public and separate schools (p. 129)." During the era of the Sixties, missionary teachers and clergymen, who held positions as principals and administrators, were replaced by personnel who had training as professional educators. When the decade came to a close, practically all direct vestige of church influence was eliminated and the education of Indian children was placed in the hands of trained and qualified educators.

In 1969, the Government of Canada issued a White Paper on Indian Policy. The main proposals contained in the White Paper were (a) to repeal the Indian Act and have it replaced with legislation that would grant the Indian autonomy in controlling his own affairs, and (b) to transfer responsibility for Indian education from federal jurisdiction to that of the provinces (Government of Canada, White Paper on Indian Policy, 1969, p. 6).

Indian Rejection of the White Paper

The response to the White Paper by the Indians across Canada was

negative. The Indians viewed the White Paper as another attempt by the federal government to assimilate the Indian into the white society. In replying to this paper the Indian Chiefs of Alberta in June, 1970, made a presentation to the Prime Minister that refuted the purport of the entire White Paper. In their presentation the Chiefs said:

> To us who are Treaty Indians, there is nothing more important than our Treaties, our lands and the well being of our future generation. We have studied carefully the contents of the Government White Paper on Indians and we have concluded that it offers despair instead of hope (Indian Chiefs of Alberta, 1970, p. 1).

The White Paper aroused such a storm of protest from Indian leaders across Canada that the Department of Indian Affairs was forced to reverse its position and its policy.

Indian Control of Indian Education

With regard to education, it would appear that the Indians wanted control of the educational processes for Native children or at least to have an influential voice in the formulation of educational policies. The Indians felt that the White Paper offered little hope of gaining the objective of Indian control of Indian education if the responsibility for Indian education were transferred from the federal government to the jurisdiction of the provincial governments. Cardinal (1969) felt that the whole question of Indian education needed to be re-examined in the light of current trends. This author, in his book, "The Unjust Society", wrote the following on this issue:

> The whole question of education has to be rethought in the light of the total needs of the Indian people. The obvious first step is the transfer of power from the people responsible for the administration of education to the people whose lives will be determined by it. No educational program can be successful, where the people most directly concerned and affected have no voice whatever in their own education. (p. 51)

The beginning of the Seventies witnessed a more militant approach by the Indian people toward Indian education. The National Indian Brotherhood submitted a policy paper to the Department of Indian Affairs in December, 1972, in which the Indian Brotherhood advocated Indian control of Indian education. They emphasized the need to change the existing curriculum in Indian schools to include Indian culture and Indian languages. Not only did the Indian people voice their desire to control the education of their children, they also recognized the need for Indians to develop technical skills in order to cope with the advanced technology that was invading life on the reserve. In this regard the brief of the Brotherhood stated:

> A new approach to qualifications for many jobs is needed, as well as change in academic/vocational courses to meet new requirements. In many cases where these jobs are within the Indian community, job specifications should be set by the Indian people, and the training itself should be supervised by the local Education Authority, which is established and/or recognized by the Band or Bands involved. Some of these positions might include teachers, counsellors, social workers, probation officers, community development workers. On a wider scale, responsible efforts must be made to encourage business and industry to open up jobs for Indian people. Job training should correspond to job opportunity and the economic reality. The local Band Education Authority should be in a position to deal directly with Canada Manpower and other training institutions (National Indian Brotherhood, 1972, p. 12).

RELATED RESEARCH

From an extensive library search of text books, devoted to the education of Native people in Canada, a minimal amount of information was found on the topic of industrial arts relative to the Indian learner. In addition, a search was also made of the standard indices used for reporting the findings of educational research, as well as a search was

made of an information retrievable system, E.R.I.C., (Educational Resources Information Centre). Both of these searches revealed very little information was available on industrial arts for Native children.

The Components of a Curriculum

Components by Definition

All the authors who have written on curriculum design and curriculum development, according to Beauchamp (1968), "have been compelled to define curriculum (p. 78)." Krug (1957) defined a curriculum as "the means of instruction used by the school to provide opportunities for student learning experiences leading to desired learning outcomes (p. 3)." Ragan (1966) in his writing provided a more general definition for the term curriculum "to include all of the experiences for which the school accepts responsibility (p. 4)." Doll (1968, p. 15) in defining the term curriculum used the definition in its broadest sense to include all the formal and informal learning experiences which are offered to learners under the auspices or direction of the school. In discussing curriculum design, Taba (1962) wrote that:

> All curricula, no matter what their particular design, are composed of certain elements. A curriculum usually contains a statement of aims and of specific objectives; it indicates some selection and organization of content; it either implies or manifests certain patterns of learning and teaching, whether because the objectives demand them or because the content organization requires them. Finally, it includes a program of evaluation of the outcomes. (p. 10)

Smith (1957) _et al_, suggests that:

> If an observer looks at the curriculum of the school in any society, he will find, either stated or implied, a set of educational objectives, a body of subject matter, a list of exercises or activities to be performed, and a way of determining whether or not the objectives have been reached by the students. (p. 8)

Robinson (1974) in writing about curriculum development was concerned that curriculum development for the predominant schools did not adequately account for the "ethnically pluralistic nature of Canadian society (p. 35)." On the issue of curriculum development for Indian education, this author wrote:

> The implications for curriculum development are revolutionary. Educationists cannot simply append the concept to the existing corpus. This chapter makes an attempt to demonstrate, with reference to specific (itself heterogenous) population, the Native groups of Canada, that (a) curriculum developers must define this pluralism in more incisive terms than heretofore; and (b) that this redefinition dictates a recategorization and reintegration of the components of curriculum development; with the outcome that (c) previously held notions about objectives, content, implementation, and resource personnel must be radically altered. (p. 35)

The literature that was reviewed for this study revealed that a minimal amount of material was written on the aims and objectives for a program of studies in industrial arts for the Native learner. However, the search did reveal that such authors as Tyler (1974), Goodlad (1966), Taba (1962), Mager (1962), and others had written extensively on formulating the aims and objectives for an instructional program. Authors such as Feirer (1964), Lindbeck (1964), Olson (1963), and Silvius and Bohn (1961) wrote on the major components that comprise a curriculum for industrial arts. One of these components is the philosophical statement which gives direction to the program and the selection of goal statements as well as the general objectives of the program.

Any design for an educational program of studies whether it is academic or technical needs to be directed by the expectations of the learning activities that comprise the program. Taba (1962) states that:

> The chief activity of education is to change individuals in some way: to add to the knowledge they possess, to enable them to perform skills which otherwise they would not perform to develop certain understandings, insights, and appreciations. (p. 194)

> perform skills which otherwise they would not perform to develop certain understandings, insights, and appreciations. (p. 194)

Specialists who have written extensively on the subject of curriculum design and curriculum development state that a curriculum is based on a philosophy of education, the broad aims, and the general objectives that give the program its direction and in the sequencing of the learning activities.

A Philosophical Statement

The relationship between a statement of philosophy and the broad aims of an educational program appear to be rather close, yet it is a relationship that needs to be clarified when establishing a curriculum for instructional purposes. While the broad aims give a program direction, it is the statement of philosophy that according to Silvius and Bohn (1961), "serves as a guide post for the development of the entire instructional program, and basically, serves as the first step in the development of a functional program of instruction (p. 12)."

These authors further comment that:

> A teacher's philosophy of education may be described as the beliefs that govern the character of his approach to education, the concepts that give direction to a program of education and the foundations upon which he builds and develops his aims for education. (p. 7)

Taba (1962) suggests that a philosophy of education "is a step toward translating the needs and values of society and of the individual into an educational program (p. 162)."

Tyler (1974), writing on the use of philosophy in selecting educational objectives, made the following observations:

> An adequate formulation of an educational and social philosophy will include the answers to several important questions. In

essence the statement of philosophy attempts to define the nature of a good life and a good society. One section of an educational philosophy would outline the values that are deemed essential to a satisfying and effective life. (p. 34)

In further discussing the topic of statement of philosophy, Tyler wrote:

For a statement of philosophy to serve most helpfully as a set of standards or a screen in selecting objectives, it needs to be stated clearly and for the main points the implications for educational objectives may need to be spelled out. (p. 37)

In relation to Indian education the National Indian Brotherhood (1972) in a policy brief submitted to the Minister of Indian Affairs and Nothern Development in Ottawa, stated the Indian philosophy of education to be:

In Indian tradition each adult is personally responsible for each child to see that he learns all he needs to know in order to live a good life. As our fathers had a clear idea of what made a good man and a good life in their society, so we modern Indians want our children to learn that happiness and satisfaction come from: pride in one's self; understanding one's fellowman, and living in harmony with nature. These lessons which are necessary for survival in this 20th century. Pride encourages us to recognize and use our talents, as well as to master the skills needed to make a living; understanding our fellowman will enable us to meet other Canadians on an equal footing, respecting cultural differences while pooling resources for the common good; living in harmony with nature will ensure preservation of the balance between man and his environment which is necessary for the future of our planet, as well as for fostering the climate in which Indian Wisdom has always flourished. We want education to give our children the knowledge to understand and be proud of themselves and the knowledge to understand the world around them. (p. iii)

A noted Canadian Indian author, Harold Cardinal (1977) views a philosophy of education for the Indian as that in which the history of the Indian people, the Indian heritage, values, customs, and languages are translated into an educational program designed to reinforce and contribute to the Indian's identity (p. 66).

From the above discussion it is evident that the authorities on curriculum consider the development of a philosophical statement to be relevant to the design of an educational program. A philosophical statement gives purpose and direction to the educational endeavours of educators. From the literature that was reviewed and from the statements on Indian education made by noted Indians, the following philosophical statement for industrial arts for the Native learner was generated:

> To create in the Indian learner a self-concept of the good life in the Indian society which will reinforce the development of the learner's potential as an individual, regardless of capabilities.
>
> To educate the Indian learner in basic technical and industrial skills so that the learner can become independent and self-sufficient and be able to function in both the Indian and non-Indian society without conflict.

Broad Aims

In designing a program of studies in education consideration needs to be given to what Preitz (1968) refers to as "the complexities of the interrelationships involved in planning any instructional program directed at functional outcomes (p. 213)." These complexities begin with a statement of philosophy and evolve into the next logical step of curriculum design, the broad aims of the program. What, then, are the broad aims of an educational or instructional program?

Silvius and Bohn (1961) suggest that some noted authors use the terms goals and aims synonymously and make no distinction between the two terms. However, these authors made a dinstinction between aims and goals when they state that:

> Goals are more limited, however, since they are concerned only with the end result, while it might be implied that aims give direction for the attainment of the goals. (p. 95)

These authors go on to define aims

> as the broad conceptual goals to be attained by a student as he pursues a course of study. They give direction to a student's educational endeavours as he moves to attain his goals. (p. 95)

Feirer and Lindbeck (1964) writing on the subject of broad aims of an industrial arts program said: "the broad aims of industrial arts is to prepare young people to live in our industrial society (p. 1)."

The National Indian Brotherhood (1972) implied what the broad aims of Indian education should be when the Brotherhood wrote the following:

> What we want for our children can be summarized very briefly; to reinforce the Indian identity; to provide the training necessary for making a good living in modern society. (p. 3)

The Indian Brotherhood elaborated on the effect the Native history and culture would have in contributing to the learner as an Indian. The following quotation illustrates the position taken by the Brotherhood on this issue:

> Unless a child learns about the forces which shape him; the history of his people, their values and customs, their language, he will never really know himself or his potential as a human being. Indian culture and values have a unique place in the history of mankind. The Indian child who learns about his heritage will be proud of it. The lessons he learns in school, his whole experience, should reinforce and contribute to the image he has of himself as an Indian. (p. 9)

From a synthesis of the literature reviewed the broad aims for a course of studies in industrial arts relevant to Indian education were generated. These broad aims are:

> To provide the Native student with the opportunities to be able to comprehend the technical society in which he lives.
>
> To develop in the student a respect for technology that will enable the Native learner to become a productive member of either the Indian or non-Indian community.

> To reinforce the Native learner's self-identity as an Indian in terms of the learner's Indian heritage, culture and values.
>
> To reinforce the Native learner's potential as an individual so as to be able to function in both the Indian and non-Indian society without conflict.

General Objectives

Once the broad aims for a program have been established, the next step in the sequential design of an instructional program is the general objectives of the program which gives the program direction, determines the instructional content, and the media to suggest the instructional procedures of the program. Authors such as Remmers, Gage, and Rummel (1965) suggest that a distinction exists between general objectives and specific objectives. Although this distinction is not a sharp one according to Remmers, Gage, and Rummel, it "represents a continuum from extreme generality to extreme specificity (p. 173)." In discussing general objectives and specific objectives these authors made the following distinction between a general objective and specific objective:

> General objectives control the general learning situation (while) . . . Specific objectives, on the other hand, are the narrower day-to-day goals. (p. 173)

The general objectives of a program are more specific in structure than the broad aims. General objectives represent the controlling factor of program design as well as helping to determine the direction of course content, while the specific objectives help to determine teaching activities of the program.

General Objectives for Innovative Industrial Arts Programs

Cochran in his book, "Innovative Programs in Industrial

Education," identified 32 innovative programs in industrial arts that existed in North America in 1970. Three of the programs have been identified by authorities as being more outstanding than the others because of the wide acceptance of each of these programs at the state/interstate or the provincial level. These three programs are: The Industrial Arts Curriculum Project of The Ohio State University, Columbus, Ohio; the American Industries Project of Stout State University, Menomonie, Wisconsin; and The Alberta Plan of The University of Alberta, Edmonton, Alberta. Each of these innovative programs will be discussed briefly for the purpose of showing the similarity between the set of general objectives that were formulated for each program and the adaptability of these general objectives to a program of industrial arts studies for Indian education.

The Industrial Arts Curriculum Project

The Industrial Arts Curriculum Project which emanated from The Ohio State University, Columbus, Ohio was the result of what Cochran (1970) referred to as,

> a growing concern that industrial arts programs were too narrow and did not provide the students with an overview of technology. (p. 77)

With the proliferation of technical advances and changes in society, industrial arts teachers and industrial arts teacher educators in the late 1950's began to question the craft-oriented traditional programs in woodworking, metals and drafting that existed as industrial arts.

The Industrial Arts Curriculum Project was developed according to Cochran (1970)

> in an attempt to provide a defensible intellectual model for industrial arts subject matter and to develop an educational system to teach this subject matter in the junior high school. (p. 78)

The three major objectives of the Industrial Arts Curriculum Project were:

> 1. To create an understanding of the concepts, principles, generalizations, problems, and strategies of industrial technologies.
>
> 2. To develop an interest in, and appreciation for, industry as an integral part of the economic system that provides material goods for the satisfaction of human wants.
>
> 3. To demonstrate knowledge and skills that will be useful in life situations of occupational, recreational, consumer, and socio-cultural importance. (Cochran, 1970, p. 79)

<u>The American Industries Project</u>

The American Industries Project was developed at the Stout State University in order that industrial arts meet the challenge of a productive society by providing the student with experiences that would help the student understand modern industry (Cochran, 1970, p. 38).

The two broad or general objectives that were generated for this project were: (1) to develop an understanding of those concepts that apply directly to industry, and (2) to develop the ability to solve prolems related to industry (Cochran, 1970, p. 40).

To formulate these general objectives, those associated with the American Industries Project first made:

> a taxonomical breakdown of the content to provide a basis for behavioural objectives. This involved, first of all, a mapping of instructional content to provide a logical sequence, and then, an analysis procedure to identify the elements to be included in the course. (Cochran, 1970, p. 40)

The Alberta Plan

The Alberta Plan was the result of an increased concern by industrial arts teacher educators in Alberta over the inability of industrial arts education to interpret the world of work. In describing this plan for industrial arts, Cochran (1970) wrote:

> Another concern of these educators was that the secondary school aspect of the Alberta Plan is conceived as a synthesizing educational process conducted within a multiple activity environment. This concept is predicated on the premise that no profession or occupation operates in a vacuum. The interrelationships of functions, processes and technologies are evident in contemporary occupations and therefore, should be presented through industrial arts. (p. 74)

To provide this innovative program with direction, the following four general objectives were formulated:

1. To provide an environment where students can reinforce and apply the academic disciplines.

2. To provide exploratory experiences in the various aspects of society.

3. To provide a synthesizing educational environment.

4. To provide an introduction to the multiplicity of career opportunities. (Cochran, 1970, p. 75)

The Indian society differs from the predominantly non-Indian society in terms of its culture, its heritage, its values, and its language. Consequently, the role that industrial arts plays in the educational process of the Native student must be in terms of the Indian's life style and the needs of the Indian society. To formulate general objectives for such an instructional program, the complexity of the tools and manufacturing processes of a productive society could no longer be taught in a unit shop.

From a review of the literature that was related to industrial

arts as well as a synthesis of the innovative programs in industrial arts discussed by Cochran (1970), the following general objectives for a program of studies in industrial arts for Indian education were designed.

> To assist the learner to develop insights and understandings of the principles and problems related to technology and its place in Canadian culture.
>
> To create in the learner an appreciation for, and an interest in, the industrial processes that are used to produce the goods and services to satisfy the human needs.
>
> To provide the learner with the opportunity to develop use level psychomotor skills that may be applied in occupational situations as well as in recreational or in cultural endeavours.
>
> To provide an environment where the learner can reinforce concepts found in the academic disciplines.
>
> To provide the learner with initial information on the multiplicity of occupations that are found in the world of work in Canada.

A Curriculum Model

Ralph Tyler (1974) in his book, "Basic Principles of Curriculum and Instruction," believes that any curriculum design or curriculum model needs to address itself to the following four fundamental questions:

1. What educational purposes should the school seek to attain?

2. What educational experiences can be provided that are likely to attain these purposes?

3. How can these educational experiences be effectively organized?

4. How can we determine whether these purposes are being attained? (Tyler, 1974, p. 1)

Dale (1972) approaches the development of a curriculum in terms of "process and product." This author contends that:

> the issue is not process versus product, form versus content, or method versus subject matter. It is rather the kinds of processes used to produce certain products . . . The issue is the kind of product desired. (p. 81)

Dale (1962) views the curriculum as a whole unit (and rightly so) in which product goes hand-in-hand with process, form with content, and method with materials. This author notes that,

> we may emphasize either product or process, form or content, method or materials. But there is no product without a process, no process without a product. Form and content go hand-in-hand, as do method and materials. (p. 89)

Taba (1962) approaches curriculum development from an initial diagnostic point of view. This author states that:

> Diagnosis is an essential part of curriculum development and of curriculum revision. To keep the curriculum in tune with the need of the time and of the students, and to help determine which objectives to stress, diagnosis should be a continuous part of an on-going curriculum and teaching. (p. 231)

Warwick (1975) alludes to an "ideal curriculum" design as one,

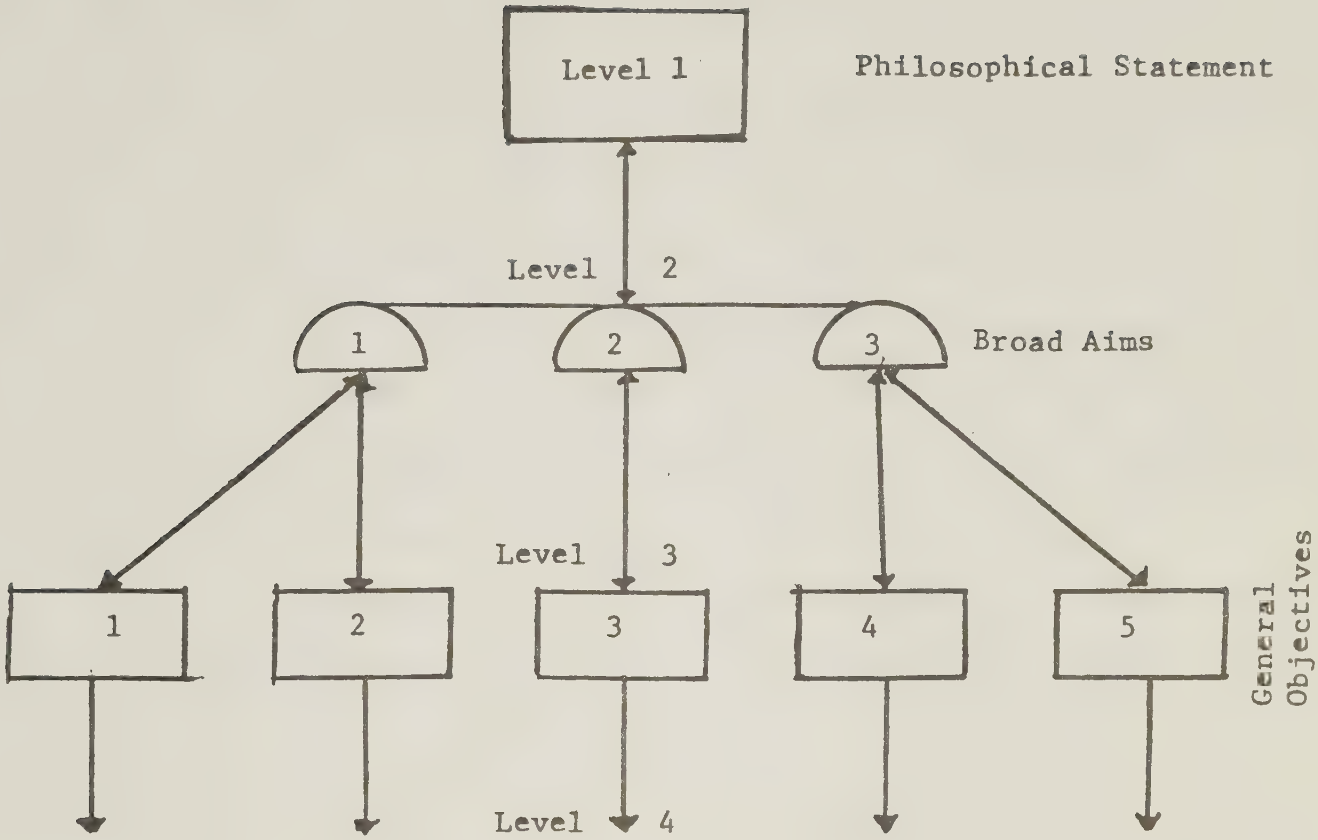
> from which every part of the work stems and toward which it strives. It may never be attained, but unless it is formulated even the first step toward this ideal cannot be made. The ideal does not derive from the educational aspirations of the head-teacher, although these play a crucial part in marshalling opinion and shaping policy. Nor does it necessarily come from an inner cabal of senior staff acting in isolation from their more junior colleagues. If the ideal curriculum is to mean anything it has to be a synthesis representing the views of all who teach within the school - the highest common factor rather than the lowest common denominator of their experience and advice. (p. 23)

Any curriculum model for an educational program will be structured on the basis of the four curriculum components discussed previously, beginning with the philosophical statement which charts the course for the whole instructional program, then the broad aims which give direction to the instructional activity, followed by the general objectives which represent the program controls, and finally the specific objectives which determine the appropriate activities in the learning situation as well as the functional outcomes.

Silvius and Bohn (1961) have written extensively on curriculum design for industrial education prior to the advent of other curriculum model builders. In their book, "Organizing Course Materials for Industrial Education," these authors discuss the components of a curriculum model for industrial education when they write in depth about the philosophy of education, the broad aims of an educational program, and the general objectives of the program.

For the purposes of this study a curriculum model is depicted by a flow chart illustrated in Figure 1. This chart illustrates the four levels of a curriculum structure. Level 1 represents the statement of philosophy; level 2 represents the broad aims; level 3 depicts the general objectives, and level 4 represents the specific objectives that lead to the activities. It is at level 4 that the in-service teacher makes a decision as to what will be the instructional objectives of the program.

The purpose of this model is to show the interrelationships of the three major components that make up the curriculum model for this study.



Specific Objectives and Appropriate Activities
Figure 1

Chapter 3

The second chapter of this report included a review of the literature that gave an overview of Indian education as it existed in the period before Confederation as well as in the period from Confederation to the end of World War II, and from the end of World War II to the present. Included in that chapter, too, were the authors who wrote tangentially on skill development for the Native learner, as well as those who wrote on curriculum design and curriculum development.

It will be recalled that the research instrument for this study was a questionnaire which was divided into five major categories. These categories were: instructor background information; instructional program; program objectives; funding; and organizational pattern. The data that were collected with the questions that made up these five categories are placed in tabular form and analysed in the following chapters. This chapter will deal with the first two categories, while the fourth chapter will deal with the remaining three categories.

EDUCATIONAL BACKGROUND OF PARTICIPANTS

The first five questions on the research instrument were designed to collect background information from those who participated in the study. This information included educational background; preparational background and experiential background of those involved in the research. Data that were collected with these five questions make up the tables of this section of this chapter.

It will be recalled from Chapter 1, page 12, that of the 33

research instruments that were posted, 24 were returned. Of the 24 questionnaires that were returned only 14 were usable. The reasons why the remaining 10 instruments were not usable is also given in Chapter 1.

The first question on the research instrument was designed so that the participants would identify the highest degree that was earned by those who completed the research instrument.

Question 1 had the following wording:

What is the highest educational degree you have earned?

- No degree ☐
- Bachelor's ☐
- Master's ☐
- Doctorate ☐
- Other (specify) ☐

For ease of responding participants were asked to check the highest degree or diploma they earned.

Table 1

Type of Degree or Diploma

Earned by Participants

Type of Degree or Diploma	Number of Participants With Degree or Diploma
Bachelor	11
Diploma	1
Master's	1
Doctorate	0
No Degree	1
	Total 14

It is evident from data that make up Table 1 that the majority of participants (11/14) held a baccalaureate. One participant held a

Master's degree, another a Diploma, and another participant indicated no degree was held.

Data in Table 1 show that those who participated in the study had teacher preparation that is similar to that found in the predominant society.

To identify the type of degree, diploma or certificate that each participant earned, question 2 on the research instrument was designed.

Question 2 was phrased as follows:

> Please state degree(s), diploma(s), or certificate(s) attained and field of study.

Table 2

Type of Degree, Diploma or Certificate Earned by Each Participant

Number of Participants	Type of Degree, Diploma or Certificate Held by Each Participant						
	Bachelor of Arts	Bachelor of Education	Bachelor of Science	Diploma/ Certificate	Master of Arts	Doctorate	No degree
5		X					
1		X	X				
1				X			
1		X		X			
1	X	X					
2			X				
1			X		X		
1			X	X			
1							X
Total 14							

Data shown in Table 2 are the data that were collected with question 2 of the research instrument.

The data in Table 2 show that 8/14 participants held a Bachelor of Education degree and that two participants held more than one baccalaureate. There were five participants who earned a Bachelor of Science degree. These data also show that one participant earned a Master's degree and two participants earned a Diploma in addition to their Bachelor's degree. In addition, data in the table show that one participant was teaching industrial arts with "no degree."

The third question on the research instrument was written to identify the type of post-secondary institution that participants attended in order for them to acquire the necessary skills, knowledge, understandings, and attitudes enabling them to become a teacher of industrial arts.

Question 3 on the instrument asked each participant to check the type of post-secondary institution they attended to prepare them to teach industrial arts. This question had the following wording:

> Identify the type of institute of a post-secondary nature where you acquired the skills to teach your program. Please check appropriate square.
>
> University
>
> Community College ☐
>
> Teacher's College ☐
>
> Technical Institute ☐
>
> Trade School ☐
>
> Trade College ☐
>
> Industry - at apprenticeship level ☐
>
> - at Master's level ☐
>
> Other (specify) ☐

A check list was provided with this question so that participants could identify the institutions where they acquired the necessary competencies to become an industrial arts teacher. The information that was collection with this question makes up Table 3.

Table 3

Type of Post-Secondary Institution

That Participants Attended

Number of Participants	Institution Attended						
	University	Community College	Teacher's College	Technical School	Trade School	Industry - Apprenticeship level	Industry - Master's level
7	X						
1	X				X		X
1					X		
1	X			X			
1			X			X	
1	X					X	
1	X	X					
1	X		X				
Total 14							

It is evident from the data in Table 3 that 12/14 participants attended university prior to teaching industrial arts in a Native school. These data show one participant who attended university also attended trade school as well as completing the Master's level of apprenticeship. Two of those who were involved in the study completed an apprenticeship program as well as attending either a technical school or a university.

Question 4 was a two-part question. The first part of this question required either a "Yes" or "No" response and asked the participants in the study if they had any technical training in industrial arts. If the response was "Yes", the participant was asked to list the technical fields of specialization.

The wording of the first part of question 4 was as follows:

Do you have any technical training?

Yes ☐

No ☐

If YES, what technical field(s) did you specialize in? Please list.

The data collected with the first part of question 4 are illustrated in Table 4 and the data collected with the second part of the question make up Table 5.

Table 4

Study Participants With Technical Training (Industrial Arts)

Number of Participants	Participants With Technical Training	
	Yes	No
6	X	
8		X
Total 14		

The data in Table 4 show that 6/14 participants of the study indicated that they had technical training. It is evident from these data that the majority of teachers who are teaching industrial arts in Native schools do not have the necessary technical training to teach industrial arts.

In the vernacular of the industrial arts teacher educator power technology is used to include sources of power generation, transmission and utilization. Woods and metals are understood to mean the tools and machines that are used to cut, form, assemble and finish these and other materials. Graphic communications include the activities that are used

Table 5

Area(s) of Specialization in

Technical Training by Participants

Number of Participants	Area(s) of Specialization			
	Power Technology	Woods	Metals	Graphic Communications
1			X	
1	X			
2		X		
1	X	X	X	X
1		X	X	
Total 6				

to reproduce copy such as letterpress printing, offset printing, serigraph printing, drafting, and photography.

Data in Table 5 show that of the six participants who indicated they had technical training, there were two out of the six who had specialized in two or more areas of industrial arts. One participant had technical training in all four areas of specialization.

The purpose of question 5 on the questionnaire was to identify the number of years of teaching experience in industrial arts each

participant had. A check list was provided with the question for ease of responding.

Question 5 had the following wording:

Including the current year what is the total number of years of experience you have teaching industrial arts (Grades 7 - 12).

The data generated by question 5 make up Table 6.

Table 6

Number of Years Experience

Teaching Industrial Arts of Each Participant

Number of Participants	Industrial Arts Teaching Experience Number of Years
1	One year
6	2 - 3 years
0	4 - 5 years
5	6 - 9 years
2	10 or more years
Total 14	

Data in Table 6 show that out of the 14 participants only two had 10 or more years of experience in teaching industrial arts. One participant had only one year of experience teaching industrial arts, while six participants had from 2 to 3 years of experience teaching industrial arts, and five participants had from 6 to 9 years of experience teaching industrial arts.

In retrospect, question 5 was considered to be a weak question in that it should have been a two-part question. The first part of the question should have asked how many years of teaching experience each participant had. The second part of the question should have asked the

participants how many years each had teaching industrial arts in Indian schools.

The second category of questions on the research instrument was directed to the instructional program of the schools where participants taught.

INSTRUCTIONAL PROGRAM

There were eight questions that made up the instructional program category. These questions were designed to collect data on the instructional program in industrial arts in participants' schools. These questions included questions on: the tenure of the industrial arts program in participating schools; the number of periods per day that the participants taught; the number of class periods in industrial arts that were taught per week; the length of time devoted to class periods in industrial arts; the percentage of time devoted to teaching the theoretical aspects and the practical aspects of industrial arts; the average enrolment of industrial arts classes of participants; the source of curriculum guides for industrial arts, and how curriculum guides are kept current.

To determine how long an industrial arts program of study was in existence in the school where the participants taught, question 6 on the research questionnaire was designed. To secure this information, question 6 asked:

> How long has a program of industrial arts been in existence at your school?

A check-list was included with this question in order to make it

easier for the participant to respond. The data received with question 6 are shown in Table 7.

Data in Table 7 reveal that out of 14 schools involved in the study, three schools had an industrial arts program that was in existence for 10 or more years. In three of the research schools, the industrial arts program was in existence for only one year at the time of the study;

Table 7

Number of Years Industrial Arts Program Existed at School of Participants

Number of Years Industrial Arts Program in Existence	Number of Schools of Participants
One year	3
2 - 3 years	5
4 - 5 years	2
6 - 9 years	1
10 or more years	3
	Total 14

in five participating schools the industrial arts program was taught from 2 to 3 years. Two schools offered a program of industrial arts from 4 to 5 years, and the remaining school had its industrial arts program from 6 to 9 years. The data in this table show that the industrial arts program in schools for Native children is a relatively recent educational program because 8/14 of these schools began to offer this program within the last five years. Historically, this program of study in Albert's predominant society can be traced to the MacDonald Manual Training Plan of 1900-1903 which began in the City of Calgary (Smith, 1973, p. 45).

Industrial arts like other non-mandatory courses such as art, music, home economics, and drama in the schools of the predominant society is offered for "X" number of periods per day. To identify the number of class periods per day that each participant taught in industrial arts, question 7 was written.

The wording of this particular question asked:

How many class periods of industrial arts do you teach per day?

A check-list was provided for participants to check the range of class periods of industrial arts taught per day. The information collected by this question is shown in Table 8.

Table 8

Number of Class Periods in Industrial Arts Taught by Participants

Number of Participants	Number of Class Periods Taught Per Day
5	1 - 3
7	4 - 6
1	7 - 8
1	Other
Total 14	

Data in this table show that 7/14 or 50 percent of the participants taught industrial arts between 4 to 6 periods per day. Five of the participants taught industrial arts between 1 to 3 periods per day, and one participant taught industrial arts between 7 to 8 periods a day. In the "Other" category, one participant indicated that he taught industrial arts on an unspecified basis, that is, there were no specified number of industrial arts class periods this teacher taught per day. It

could be questioned whether or not this particular industrial arts program could be considered structured because of its ad hoc nature.

Similar to other teachers who teach other subjects in a junior or senior high school, an industrial arts teacher teaches "X" number of periods per week. This teaching assignment can vary from school to school.

To determine the number of class periods per week that each participant taught in industrial arts, question 8 was written. This question asked:

How many class periods of industrial arts do you teach per week?

To respond to this question participants checked the box which indicated the appropriate number of periods per week of industrial arts they taught. The data collected by question 8 is shown in Table 9.

Table 9

Number of Class Periods Per Week in Industrial Arts Taught by Participants

Number of Participants	Number of Class Periods Taught Per Week
1	1 - 5
1	6 - 10
2	11 - 15
2	16 - 20
2	21 - 25
2	26 - 30
1	31 - 35
1	Over 35
Total 14	

Data in this table show the wide range of class periods in

industrial arts taught by those involved in the study who answered question 8. The range of class periods taught by participants was from a minimum of 1-5 periods per week (3 participants) to a maximum of over 35 periods a week (1 participant). The mean number of industrial arts class periods taught per week was between 16-20 periods per week. Implied in these data is the fact that participants had other teaching assignments in addition to teaching industrial arts. What these other teaching assignments were, was not the concern of this research.

The number of minutes that are devoted to teaching any subject in a junior or senior high school is referred to as the length of the class periods. Question 9 on the questionnaire was written to determine the number of minutes there were in each class period devoted to industrial arts in schools where participants taught. This question asked:

> How many minutes are there in a class period that is devoted to industrial arts?

The data in Table 10 show the number of minutes per class period devoted to teaching industrial arts in the school of the participants.

The data in Table 10 show that in 5/14 of the participating schools the length of the class periods devoted to industrial arts varied between 41 to 50 minutes. There were two participants who indicated that their time for teaching each class period of industrial arts varied between 31-40 minutes. At the other extreme, two participants checked that the length of class periods for industrial arts was 150 minutes. Because of the length of the latter class period, it is possible that this period might have been a double period that was timetabled for teaching industrial arts on a once-a-week basis.

Table 10

Number of Minutes Per Class Period in Industrial Arts Taught by Participants

Number of Participants	Number of Minutes Per Industrial Arts Period
0	30 minutes
2	31 - 40
5	41 - 50
2	51 - 60
3	61 - 90
2	Other[a]
Total 14	

[a]Periods varied from a minimum of 45 minutes to a maximum of 150 minutes.

The content for industrial arts includes both theory and practice. The latter involves learning activities where something is made or constructed--a product. The former involves the learning associated with the physical characteristics of a material or of a hand tool or a machine tool to work a material.

To determine the amount of time participants devoted to teaching the theoretical and the practical aspects of industrial arts, question 10 was written as follows:

> Please list the percentage of your overall time that is spent in your industrial arts classes.
>
> In teaching theory ________________
>
> In teaching practical ________________

The data that were generated by this question are presented in Table 11.

The data in Table 11 show a wide range for the percentage of time that participants devoted to teaching the theoretical component and

the practical component of industrial arts. These ranges vary from 100 percent devoted to teaching the practical aspects of industrial arts with no theory included (1 participant), to 50 percent of time devoted to teaching both the theoretical aspect and the practical aspects of industrial arts (1 participant). Three participants indicated that they devoted 20 percent of their teaching time to teaching theory and the remaining 80 percent of their time was spent teaching the practical component of industrial arts.

Table 11

Percentage of Time Participants Devote to Teaching Theory and Practical Aspects of Industrial Arts

Number of Participants	Percentage of Time	
	Theory	Practical
1	0	100
1	5	95
1	10	90
2	15	85
3	20	80
0	25	75
1	30	70
2	35	65
2	40	60
0	45	55
1	50	50
Total 14		

Because of the nature of the learning environment where industrial arts is taught, class size is normally smaller than the class size for other subject areas. To determine the average enrolment for industrial arts classes of participants, question 11 was written. A check

list was provided with this question for ease of response. To obtain this information on class enrolment, question 11 asked:

> What is the average enrolment for the industrial arts classes that you teach?

Table 12 includes the data collected with this question.

The data in Table 12 show that the average class enrolment of 9/14 of the participants was between 11 and 15 students for the industrial arts classes they taught. There were 3 participants whose industrial arts class enrolment was between 6 and 10 students. One participant had an average industrial arts class enrolment of between 16 and 20 students, while another participant had between 21 and 25 students enrolled in an industrial arts class. It is evident from these data that the average class enrolment for industrial arts classes taught to the Native learner was within the range of class size recommended by some authorities. These authorities recommend that the class size for industrial arts be kept to 15 students.

Table 12

Average Industrial Arts Class Enrolment of Participants

Number of Participants	Average Enrolment Per Class
3	6 - 10
9	11 - 15
1	16 - 20
1	21 - 25
0	26 or over
Total 14	

To determine if industrial arts curriculum guides had been developed for use with Native learners and the origin of these guides, question 12 was formulated. This was a two-part question. The first part of this question asked for either a "Yes" or "No" answer. If the response was "Yes" the participant was then asked to give the origin of the industrial arts curriculum guides that were used in the industrial arts program.

To obtain this kind of information, question 12 was stated thusly:

> Have curriculum guides been developed that are required for use in the industrial arts program in your school?
>
> Yes ☐
>
> No ☐
>
> If YES, where did these guides originate?

The data generated with this question are illustrated in Table 13 and Table 14.

Table 13

Curriculum Guides Developed for Use With Industrial Arts Program of Participants

Number of Participants	Have Curriculum Guides Designed for Industrial Arts	
	Yes	No
10	X	
3		X
1[a]		
Total 14		

[a]No response by one participant.

The data in Table 13 reveal that 10/14 participants had curriculum guides that were developed for use with the industrial arts program

that they taught in Indian schools. There were 3 participants who reported that a curriculum guide was not used in their schools for teaching industrial arts. One participant did not respond to this question.

The data shown in Table 14 reveal that only 10 out of the 14 participants responded to the second half of question 12. Out of the 9 participants who responded, 8 indicated that the industrial arts curriculum guide that they were using originated with a provincial department of education. The other participant indicated that the department of education of a territorial government was responsible for the preparation of the curriculum guide that was used.

Table 14

Origin of Industrial Arts Curriculum Guides in Participating Schools

Number of Participants	Origin of Curriculum Guides		
	Provincial	Federal	Territorial
8	X		
1			X
1[a]			
Total 10			

[a]No response by participant.

The purpose of question 13 was to ascertain if industrial arts curriculum guides were developed in conjunction with the ongoing general academic program of the school where the participants taught. The participants were asked to check either "Yes" or "No" to the following question.

Were these guides developed in conjunction with the ongoing general academic program in your school?

Yes ☐

No ☐

Table 15 includes data that were collected with this question.

Data in Table 15 show that only 10 of the 14 participants checked either "Yes" or "No" to question 13. These data show that 6 participants indicated that the curriculum guides for industrial arts used in their school were not developed in conjunction with the general academic program of their school. Four of the participants indicated that the curriculum guides they used were developed with the academic program of their school.

Table 15

Design of Industrial Arts Curriculum Guides Relative to General Academic Program

Number of Participants	Guides Used With Ongoing Academic Program	
	Yes	No
4	X	
6		X
Total 10		

Chapter 4

As reported previously, the research instrument for this study was divided into five categories. Data collected with the first two categories of the instrument, that dealt with instructor background and the instructional program, were tabulated and analysed in Chapter 3. Other data that were collected with questions from the other three categories of the questionnaire are placed in tables and analysed in this chapter. These three categories included: program objectives; funding; and organizational pattern.

PROGRAM OBJECTIVES

Authorities in the field of curriculum design and curriculum development readily acknowledge that program objectives give direction to any instructional program or activity. It was for this reason that question 14 on the questionnaire was designed and had the following wording:

> Below is a list of objective statements for industrial arts that are most commonly found in the professional literature. Please place these statements in rank order (1, 2, 3, etc) for those that coincide with the objective statements for the industrial arts program that you teach.

The objectives that are included with this question of the instrument are found in Appendix E, page 145, which exhibits the entire instrument.

That data in Table 16 show a rank order for the objective statements that participants ranked for their congruence with the objective

statements for the industrial arts program that they taught.

Table 16

Objective Statements for Industrial Arts Program

Ranked by 14 Participants

Objective Statements	Rank	Number of Participants Ranking Objectives	Percentage of Responding Participants
To develop in each student a measure of skill in the use of common tools and machines.	1.0	14	100.0
To discover and to develop creative technical talents in students.	2.5	10	71.4
To provide general all-around technical knowledge and skill.	2.5	10	71.4
To provide pre-vocational experience of an intensified nature for those students interested in technical work.	3.5	8	57.1
To develop worthy leisure time interests.	3.5	8	57.1
To develop problem solving skills relating to materials and processes.	4.0	7	50.0
To develop consumer knowledge of use of industrial products.	5.5	4	28.6
To develop an understanding of Canada's technical culture.	5.5	4	28.6

N = 14

It was decided to set the minimum number of participants ranking an objective at four. That is, an objective that was ranked by less

than four participants was considered to be insignificant and was eliminated from the study.

It is evident from these data in this table that participants saw a congruence between the skill development objective on the instrument and a similar objective that had been established for their industrial arts program. Of the eight objectives listed on the research instrument, the skill development objective was ranked first by 14 participants. Two of the objectives on the questionnaire relating to the development of technical talent and to the development of technical knowledge were both ranked second by 10 participants. The objectives relating to pre-vocational training development and the development of leisure time interests were each placed third in rank order by eight participants. Seven of the participants ranked the problem solving skills objective in fourth. The objective relating to development of consumer knowledge and in the use of industrial products and the objective pertaining to the development of knowledge of Canada's technical culture were each ranked fifth by four participants.

FUNDING

Two of the questions on the research instrument were designed to identify the source of funding for the industrial arts program of participants and to determine if the funds provided were adequate to meet the needs of the industrial arts program in their schools.

To determine whether funds were provided by a provincial government, the federal government or whether funds were provided from other sources, question 15 was written. In this question the participant was asked:

Is the program you teach supported by

Provincial funds? ☐

Federal funds? ☐

Other (specify) ☐

The data collected with this question are shown in Table 17.

Table 17

Sources of Funding for Industrial Arts Program Taught by Participants

Number of Participants	Sources of Funds			
	Provincial	Federal	Other	N.I.[a]
10		X		
3			X	
1				X
Total 14				

[a]N.I. = Origin of funds not indicated.

It is evident from the data in the above table that 10/14 participants in the study identified the federal government as the major source of funding for the industrial arts program in the schools where they taught. Three of the participants checked the "Other" category and identified "Other" as a territorial government. One participant did not identify the source of funding for industrial arts.

Question 16 on the questionnaire was written as a two-part question. The first part of the question was designed to determine if participants considered the funds for their industrial arts program to be adequate. To this part of the question the participants were to respond either "Yes" or "No". If the response was "No" participants were asked to state the reason, in the blank provided, why they

considered the funding for industrial arts to be inadequate.

Data shown in Table 18 reflect the information generated by the first part of this question which asked:

In your opinion, is your program adequately funded?

Yes ☐

No ☐

If NO, why?

Table 18

Adequacy of Funding for Industrial Arts Programs Taught by Participants

Number of Participants	Adequacy of Funding	
	Yes	No
6	X	
7		X
1[a]		
Total 14		

[a]No response.

Data shown in Table 18 reveal that 7/14 participants considered the funding for the industrial arts program that they taught to be inadequate. Approximately one half or 6/14 participants indicated that the funds provided for the industrial arts program were adequate. One participant did not respond to this question.

Seven of the participants who checked "No" gave the following reasons why they felt the funds for their industrial arts program were inadequate:

Equipment in short supply.

Little capital money available.

Insufficient space and equipment.

> Lack of materials to work with.
>
> Because of the extreme inefficiency of the Department of Indian Affairs and Northern Development. Theoretically, the funds are there; in practice, orders get fouled up everytime.
>
> Inflation rapidly eroding a budget which has remained unchanged for years.
>
> Low on priority list of improvements.

The significance of these comments is that the lack of funds has placed limitations on the scope of the industrial arts program that is offered to Native students in the Native schools in this country.

ORGANIZATIONAL PATTERN

The remaining nine questions on the research instrument were designed to determine the following: the structure of the industrial arts laboratory in the Native schools where the participants taught; to identify the kinds of activity programs in industrial arts that were being offered to the Native students in each of the Indian schools that took part in the study; to determine the physical size of each industrial arts facility of participating schools; and to ascertain if participants considered the program in industrial arts, that they taught, was meeting the needs of the Indian learner.

To determine the type of industrial arts facility that was used to teach Native learners industrial arts, question 17 was written. A short description for each type of industrial arts facility was included so that a commonality of terminology was established. To respond to this question all the participants had to do was to check the appropriate description.

The format of this question was as follows:

Is the structure of your shop:

(a) A unit shop, that is, a shop which offers an activity in a single major field such as woodworking or metal working?

(b) A general shop, that is, a shop designed for two or more major activities carried on under the direction of one teacher?

(c) A multiple activity shop, that is, a shop designed for a combination of unrelated major activities of different materials or occupations such as woodworking, drafting, metalworking, plastics, etc.?

In Table 19 are the data that were collected with question 17.

Table 19

Structure of Industrial Arts Facility in Schools Where Participants Taught

Number of Participants	Structure of Industrial Arts Facility		
	Unit Shop	General Shop	Multiple-Activity Shop
6	X		
4		X	
3			X
1[a]			
Total 14			

[a]No response.

From the data presented in Table 19 it can be seen that 6/14 participants taught industrial arts in a unit ship; four participants taught industrial arts in a general shop and three participants taught industrial arts in a multiple-activity shop. One participant did not respond to this question.

The purpose of question 18 on the research instrument was to identify the kinds of learning activities that were taught to Native learners by industrial arts teachers who participated in the

investigation. A list of the more common industrial arts activities that are normally taught make up the content of this question.

To collect this information, question 18 was written as follows:

In the industrial arts facility where you teach check those activities that are being taught:

- Woodwork ☐
- Materials ☐
- Technologies ☐
- Arts and Crafts ☐

Table 20 contains the data obtained with this question.

Table 20

Industrial Arts Activities

Taught by Participants

Number of Participants	Industrial Arts Activities Taught by Participants			
	Woodwork	Materials	Technologies	Arts & Crafts
2	X	X	X	X
1	X	X	X	
1	X	X		X
3	X	X		
1	X		X	
1	X			X
5	X			
Total 14				

Data in the above table reveal that only two participants taught four of the activities listed. These activities included woodworking, materials, technologies, and arts and crafts. There were two participants who taught in three activity areas in industrial arts. Of these two participants, one participant taught woodwork, materials and

technologies and the other participants taught woodwork, materials and arts and crafts. There were five participants who taught two of the four listed activities. Three out of these five participants taught woodwork and materials while one participant taught woodwork and technologies and the other participant taught woodwork and arts and crafts. There were 5/14 of these industrial arts teachers in Native schools who taught woodworking only. Data in this table also reveal that all of the 14 participants taught woodworking as an industrial arts learning activity.

Materials in this study is used as a generic term to include: woods, metals, plastics, leather, textiles, and lapidary. The materials that are taught in an industrial arts program will vary from school to school. To determine what materials industrial arts teachers involved in the study taught, question 19 was designed.

To make it easier for participants to respond to this question a list of materials was included. All the participants had to do was to rank these materials according to the amount of time devoted to teaching each material.

Question 19 asked the following of participants:

If materials are taught, please rank them in the list below with respect to the amount of time devoted to each (1, 2, 3, etc).

- Woods ☐
- Plastics ☐
- Metals ☐
- Leather ☐
- Textiles ☐
- Lapidary ☐
- Other ☐

Table 21

Materials Taught by Participants

Number of Participants	Woods	Plastics	Metals	Leather	Textiles	Lapidary	Other
	Ranking of Time Devoted to Materials Taught by Participants						
1	1		2	3			
1	1		2	4		5	3[a]
1	1		2	3	4		
1	1	3	3				
1	1		2				
2[b]							
Total 7							

[a]Earths.
[b]Not ranked by participants.

In this table are data which show that only 7 of the 14 participants answered this question. Five of these 7 participants ranked woods first which implies that each participant devoted a greater amount of teaching time to woods as a material than any of the other materials listed. There were 4 participants who ranked metals second and 1 participant who ranked metals third. Leather was ranked third by 2 participants and fourth by 1 participant. One participant ranked plastics third while another participant ranked textiles fourth. Lapidary was ranked fifth by 1 participant and 1 participant placed ceramics in the "Other" category and ranked it third. There were two participants who did not respond to question 19. Data in the above table also reveal that four participants taught three or more of the materials listed in their industrial arts program and one participant taught only two of

these materials.

The visual communications area of an industrial arts program consists of several learning activities which could include: drafting, photography (black and white and colour); printing (offset and letterpress); and silkscreen printing.

Question 20 on the questionnaire was written to determine which of the participating schools included visual communications as part of their industrial arts instructional activities, and what components of visual communications were being taught by the participants. To facilitate ease of response to this question the various processes that make up visual communications were included. All participants had to do was to check the appropriate activities that they taught.

Question 20 was written as follows:

Which of the following areas of Visual Communications do you teach?

Drafting	☐
Photography - Black and White	☐
- Colour	☐
Printing - Offset	☐
- Letterpress	☐
Silkscreen	☐
Other (specify)	☐

The data shown in Table 22 were collected with this question.

From the data reflected in this table it is evident that 6/14 participants taught only drafting as a major component of visual communications. There were 3 participants who taught two of the five visual communications activities that were listed. These activities were: drafting and black and white photography. One participant taught four of the five activities listed in the table. These activities included:

Table 22

Visual Communications Taught

by Participants

Number of Participants	Drafting	Silkscreen	Photography: Black/White	Photography: Colour	Printing: Offset	Printing: Letterpress	Other
1	X	X	X			X	
3	X		X				
6	X						
4							X[a]
Total 14							

[a]Visual communications not included as an industrial arts activity.

drafting; black and white photography; silkscreen; and letterpress printing. Four participants indicated under "Other" that none of the components that make up visual communications were included as an industrial arts activity in their schools. These data also show that 10 participants taught drafting as a major activity in visual communications.

The power technology in industrial arts, like materials and visual communications previously discussed, also consist of a variety of learning activities. For the purpose of this study the following learning activities are included under the generic term "power technology": power mechanics (the internal combustion engine); electricity; electronics; hydraulics; fluids and mechanical testing. To determine if power technology was included in the industrial arts program in the participating schools and to determine what learning activities are included in power technology question 21 asked:

Which of the following areas in Power Technology do you teach?

Power Mechanics	☐	Hydraulics	☐
Electricity	☐	Fluids	☐
Electronics	☐	Mechanical Testing	☐

Table 23 illustrates the data collected with question 21 on the research instrument.

Table 23

Power Technology Taught by Participants

Number of Participants	Power Mechanics	Electricity	Electronics	Hydraulics	Fluids	Mechanical Testing
1	X	X	X	X	X	X
2	X	X	X			
1	X	X		X		
3	X					
1		X				
6[a]						
Total 14						

[a]Power mechanics not included as an industrial arts activity.

The data in Table 23 show that one participant taught all of the learning activities listed for power technology which included: power mechanics; electricity; electronics; hydraulics; fluids; and mechanical testing. There were 3 participants who indicated they taught three of the activities for power technology. Of these 3 participants, 2 participants taught power mechanics, electricity and electronics in their industrial arts program and the other participant taught power mechanics,

electricity and hydraulics. Four participants of the study taught only one category of power technology; 3 participants taught only power and the other participant taught electricity. Approximately one half (6/14) of the participants indicated that power technology was not offered as part of the industrial arts program where they taught.

Question 22 on the questionnaire was divided into nine categories, from (a) to (i). The purpose of this question was to identify the type of capital equipment found in the industrial arts facilities of each participating school. On the research instrument large pieces of capital equipment, such as machine tools, were included under the following categories: woods, metals, sheet metal, ceramics, plastics, photography, graphic communications, power testing, and lapidary. Participants were asked to check each square to identify the appropriate pieces of capital equipment that they had in their industrial arts shop.

Which of the major pieces of capital equipment is found in your industrial arts facility?

(a) Woods

Circular Saw	☐	Jointer	☐
Radial Arm Saw	☐	Lathe	☐
Band Saw	☐	Shaper	☐
Jig Saw	☐		

(b) Metals

Milling Machine - horizontal	☐	Bending Jig	☐
- vertical	☐	Metal Lathe	☐
Drill Press - bench	☐	Tool Grinder	☐
- floor	☐		

(c) Sheet Metal

Break - Box and Pan	☐	Stakes	☐
Squaring Shear	☐	Stake Plate	☐
Notcher	☐	Bender - Metal Former	☐
Forming Rolls	☐	Spot Welder	☐
Rotary Machine Combination	☐		

(d) Ceramics

Kiln	☐	Pug Mill	☐
Pottery Wheel	☐	Modelling Tool	☐
Blunger	☐		

(e) Plastics

Laminating Press	☐	Electric Oven	☐
Mold - Expandable Bead	☐	Injection Press	☐
Buffing and Polishing Unit	☐	Rotational Molder	☐
Vacuum & Blow Forming Unit	☐	Air Compressor	☐
Thermosetting Machine	☐	Welding Torch	☐

(f) Photography

Enlarger - Black and White	☐	Electric Dryer	☐
- Colour	☐	Cameras - 35 mm	☐
Contact Printer -		- Other	☐
- Black and White	☐		
- Colour	☐		

(g) Graphic Communications

Camera - Horizontal Process	☐	Headliner	☐
Collater - 12 station	☐	Strip Printer	☐
Power Paper Cutter	☐	Power Jogger	☐
Paper Drill - table model	☐	Plate Exposure Unit	☐
Duplicator - Offset	☐	Typewriter - 15" carriage	☐
Electrostatic Copier and Converter	☐		

(h) Power Testing

Compression Tester	☐
Engine Analysis System	☐
Small Engine Station Complete	☐
Spark Plug Cleaner & Tester	☐
Engine Analyzer	☐
Scope-ignition Simulator	☐

(i) Lapidary

Tumbler	☐	Diamond Trimsaw	☐
Grinding and Polishing Wheels	☐	Lapping Machine	☐

The data collected with question 22 make up the content of Table 24 (A), (B), (C), (D), (E), (F), (G), (H), (I). Data in each table will be analysed in the paragraph(s) immediately following the table.

Table 24(A)

Woodworking Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Circular Saw	Radial Arm Saw	Band Saw	Jig Saw	Jointer	Lathe	Shaper
2	X		X	X	X	X	X
1	X	X	X	X	X	X	X
1	X		X		X	X	
2	X	X	X	X	X	X	
2	X	X	X		X	X	
1	X		X	X	X	X	
1	X				X	X	
1	X	X	X	X	X		X
1	X			X			
1	X	X	X	X		X	
1[a]							
Total 14							

[a]No response by participant.

From the data in the above table it is evident that a variety of capital equipment used to work woods was part of the capital equipment in industrial arts facilities where the participants taught. All but one participant had a circular saw.

Other pieces of capital equipment that could be found in the industrial arts facilities of the participants are: band saw, jointer, and wood lathe (11 schools); jig saw (9 schools); radial arm saw (7 schools); and a shaper (4 schools).

This ranking of the variety of woodworking power equipment that exists in some of these schools and cross-referencing data in Table 19 with data in Table 24(A), it is evident why this variety exists. It is because data in Table 19 show that the organizational pattern for six of the participating schools was a unit shop woodworking.

Table 24(B)

Metals Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Drill Press - bench	Drill Press - floor	Milling machine - horizontal	Milling machine - vertical	Bending Jig	Metal Lathe	Tool Grinder
1	X	X	X	X	X	X	X
1		X				X	
5		X					X
2		X			X		X
5[a]							
Total 14							

[a]No equipment in metals category.

It can be seen from the data presented in Table 24(B) that 5/14 participants reported that they do not possess any capital equipment in the Metals category in their industrial arts facilities.

It is evident from these data the limited kinds of metalworking

capital equipment found in the industrial arts facilities of 6 participants who reported they had only two pieces of capital equipment listed in the table. Of these 6 participants, 5 participants had a floor model drill press and a tool grinder, and the other participant had a floor model drill press and a metal lathe. There were two participants who reported they had three pieces of metalworking capital equipment with which to work. These included: a floor model drill press; a bending jig; and a tool grinder. All the capital equipment to work metal that are listed in Table 24(B) could be found in the industrial arts facilities of only one participant.

From the data presented in Table 24(C) it is evident that 50 percent of the participants (7/14) of the study reported they did not have sheet metal working capital equipment in the industrial arts facilities where they taught.

Of the capital equipment in the sheet metal category that are listed in Table 24(C) the following could be found in the industrial arts facilities of the other seven participants: a break box and pan and stake plates (5 schools); forming tools, a bender - metal former and a spot welder (4 schools); stakes (3 schools); squaring shear (2 schools); and notcher (1 school). It can be seen from the data in the table that sheet metals as a learning activity in industrial arts was taught in 7 of the participating schools. Cross-referencing data from Table 24(C) with data in Table 21 reveals a discrepancy in the research data. Data in Table 24(C) show that 7 schools do not have any sheet metal working capital equipment. However, data in Table 21 show that only 5 of the participating schools listed sheet metal as a learning activity.

Table 24(C)

Sheet Metals Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Break Box and Pan	Squaring Shear	Notcher	Forming Rolls	Rotary Machine Combination	Stakes	Stake Plate	Bender - Metal Former	Spot Welder
1	X					X	X	X	X
1	X	X		X	X	X	X	X	X
1						X	X		
1									X
1	X	X	X	X	X	X	X	X	
1	X			X					
1	X			X			X	X	X
7[a]									
Total 14									

[a]No sheet metals equipment.

Table 24(D)

Ceramic Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Kiln	Pottery Wheel	Blunger	Pug Mill	Modelling Tools
1	X	X		X	X
2	X	X			X
2	X	X			
2	X				
7[a]					
Total 14					

[a]No ceramic equipment.

Data in Table 24(D) show 7/14 of the participants or 50 percent reported that the capital equipment involved with ceramic activities was not available in the industrial arts facilities where they taught. The remaining 7 participants of the study reported the following items of capital equipment in the ceramic category: kiln (4 schools); pottery wheel (3 schools); modelling tools (2 schools); pug mill (1 school); and no school having a blunger.

It is evident from these data that ceramics for industrial arts as a learning activity was limited in scope by the kind of ceramic equipment that exist in the industrial arts facilities of the participating schools.

Table 24(E)

Plastics Equipment Found in
Industrial Arts Facilities of Participants

Number of Participants	Laminated Press	Mold - Expandable Bead	Buffing and Polishing Unit	Vacuum and Blow Forming Unit	Thermosetting Machine	Electric Oven	Injection Press	Rational Molder	Air Compressor	Welding Torch
1				X		X				X
1						X				X
1	X									
11[a]										
Total 14										

[a]No plastics equipment.

It is evident from data in Table 24(E) that approximately 78 percent of the participants, 11 out of 14, reported that capital

equipment to work plastics did not exist in their school. Of the 10 pieces of plastics capital equipment listed, only one participant reported that three of these pieces of plastics equipment were in the shop. These items included a vacuum and blow forming unit, an electric oven and an injection press. One other participant had only two pieces of capital equipment to work plastics--an electric oven and a welding torch, while another participant had only one piece of equipment, a laminated press.

These data also show that plastics, one of our modern materials, and the machines to work these materials is not being taught to the Native learner. In addition, these data show the minimal amount of plastics equipment that was available in participating schools.

The data presented in Table 24(F) show that over 50 percent of the participants (8/14) do not have any photographic equipment in their industrial arts facilities. There were two participants who had all of the equipment listed in the photographic category. This equipment was for working with black and white film only and included: a black and white enlarger; a black and white contact printer; an electric oven; and a 35 mm camera. For photographic equipment one participant reported the following: a black and white enlarger; an electric dryer; a 35 mm camera and a medium format press. Another participant indicated that a black and white enlarger together with a TV camera and its ancillary equipment were part of the capital equipment categorized as "photographic equipment." One participant reported that the only photographic equipment he had was a black and white enlarger. Another participant reported that a black and white enlarger as well as a colour enlarger were

Table 24(F)

Photographic Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Enlarger: - Black & White	Enlarger: - Colour	Contact Printer: - Black & White	Contact Printer: - Colour	Electric Dryer	Camera: - 35 mm	Camera: - Other
2	X		X		X	X	
1	X				X	X	X[a]
1	X						X[b]
1	X	X[c]					
1	X						
8[d]							
Total 14							

[a] 120 medium format press.
[b] TV camera and ancillary equipment.
[c] Enlarger not used for industrial arts instructional activities.
[d] No photographic equipment.

located in the industrial arts laboratory but, that this equipment was not used by the industrial arts program in that particular school.

It can be seen from the data in Table 24(F) that photography as a learning activity was not being taught to the Native learner in over 55 percent of the participating schools (8/14). These data also reveal that a minimum amount of photography equipment was available in approximately 30 percent of the industrial arts facilities of those who participated in the study.

Data illustrated in Table 24(G) show that graphic communications is not being taught to the Native student as an industrial arts activity in any of the participating schools. Thirteen of the 14 participants

Table 24(G)

Graphic Communications Equipment Found in
Industrial Arts Facilities of Participants

	Number of Participants	Camera - Horizontal Process	Collater - 12 station	Power Paper Cutter	Paper Drill - table model	Duplicator - Offset	Electrostatic Copier & Converter	Headliner	Strip Printer	Power Jogger	Plate Exposure Unit	Typewriter - 15" carriage
	1			X								
	13[a]											
Total	14											

[a]No graphic communications equipment.

reported that graphic communications equipment did not exist in their industrial arts facilities. Only one participant reported a power paper cutter as an item of capital equipment.

Data presented in Table 24(H) reveal that no power testing equipment was found in approximately 64 percent of the industrial arts facilities (9/14) of participants. Of the remaining 5 participants, one participant reported having capital items of power testing equipment: compression tester; small engine station complete; spark plug cleaner and tester; and a scope-ignition simulator. Another participant reported a compression tester as capital equipment for power testing. The other 3 participants reported having only one piece of equipment which was a spark plug cleaner and tester.

These data can also be interpreted to mean that power testing as a learning activity for the Native learner was limited in its scope

Table 24(H)

Power Testing Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Compression Tester	Engine Analysis System	Small Engine Station Complete	Spark Plug Cleaner & Tester	Engine Analyzer	Scope-ignition Simulator
1	X		X	X		X
1	X		X	X		
3				X		
9[a]						
Total 14						

[a]No power testing equipment.

due to the limited number of schools that reported owning power testing equipment.

From the data presented in Table 24(I) it is evident that 11/14 of the participants do not have any lapidary equipment in their industrial arts facilities. Only two participants reported they had all of the lapidary equipment listed. In these two schools this equipment included: a tumbler; grinding and polishing wheels; a diamond trimsaw; and a lapping machine. The remaining participant had a tumbler and a grinding and polishing wheel as lapidary equipment.

It is evident from these data that lapidary is not included as part of the industrial arts program in approximately 79 percent of the participating schools. An inference from these data can be made that Native students in participating schools are not being exposed to

Table 24(I)

Lapidary Equipment Found in

Industrial Arts Facilities of Participants

Number of Participants	Tumbler	Grinding and Polishing Wheels	Diamond Trimsaw	Lapping Machine
2	X	X	X	X
1	X	X		
11[a]				
Total 14				

[a]No lapidary equipment.

to lapidary as a learning experience and where the students are exposed, it is minimal exposure.

A well equipped industrial arts laboratory designed to provide a multiplicity of learning experiences for the student, besides having the components that comprise the major activity area(s) also has other facilities which are used as part of the learning environment. These other components of the physical layout for an industrial arts facility might include a reading room, a paint room, a motor test room, as well as instructional material to support instruction. These facilities will vary from school to school.

The purpose of question 23 on the questionnaire was to determine which of the ancillary areas were included as part of the industrial arts facilities in the schools of the participants. This question was written as follows:

Does your industrial arts facility have the following: (check those applicable) -

Reference library	☐	Reading room	☐
Welding booth	☐	Motor test room	☐
Instructional materials		Paint room	☐
- printed	☐		
- non-printed	☐		

To respond the participants were asked to check the appropriate square to indicate the ancillary areas that are included in the physical layout of their industrial arts facility.

Table 25

Ancillary Facilities in

Industrial Arts Facilities of Participants

Number of Participants	Reference Library	Welding Booth	Instructional Materials: - printed	Instructional Materials: - non-printed	Reading Room	Motor Test Room	Paint Room
1	X	X	X	X		X	X
1			X	X			X
1	X						
1	X						X
1	X	X			X		X
1	X		X	X			X
1	X	X	X	X			
1		X	X	X	X	X	X
1				X			
1							X
1	X	X	X	X	X		X
3[a]							
Total 14							

[a]None of the facilities listed in the question.

The data presented in Table 25 show that a variety of ancillary areas exist in the industrial arts facilities of the participants, with only one school listing 6 of the 7 ancillary facilities that could be found in the industrial arts facilities. The ancillary facilities of the participating schools are: a paint room (8 schools); a reference library and non-printed instructional material (7 schools); printed instructional materials (6 schools); a welding booth (5 schools); a reading room (3 schools); a motor test room (2 schools). There were three participants who reported that they did not have any of the ancillary facilities listed in their schools.

The design of question 24 on the research instrument was to determine the physical size of existing industrial arts facilities in which the participants taught. To respond to the question all the participants had to do was to check the appropriate square. This question asked the following:

Is the industrial arts facility where you teach -

- 1,000 to 1,200 square feet ☐
- 1,300 to 1,500 square feet ☐
- 1,600 to 1,800 square feet ☐
- 1,900 to 2,100 square feet ☐
- 2,200 to 2,400 square feet ☐
- More than 2,400 square feet ☐

The data generated with this question are presented in Table 26.

The data in Table 26 show the physical size of industrial arts facilities for the 13 participants who responded to this question. Of the 13 participants, 4 participants indicated that the size of their industrial arts facility was between 1,000 square feet and 1,200 square feet. Three other participants reported that their facility for

Table 26

Physical Size of

Industrial Arts Facility

Number of Participants	1,000 to 1,200 square feet	1,300 to 1,500 square feet	1,600 to 1,800 square feet	1,900 to 2,100 square feet	2,200 to 2,400 square feet	More than 2,400 square feet
4	X					
3			X			
3					X	
3						X
1[a]						
Total 14						

[a]No response.

industrial arts was between 1,600 square feet and 1,800 square feet, while another three participants indicated that 2,200 square feet to 2,400 square feet was the physical size of their industrial arts facilities. There were three study participants who reported having industrial arts facilities with a physical size that was more than 2,400 square feet. One participant did not respond to this question.

The data in Table 26 show that over 30 percent of the study participants were teaching industrial arts in rooms that were well below the standards set by Alberta Education in its 1977 School Buildings Regulations which recommends that the maximum size for industrial arts for a single laboratory be 2,800 square feet and a double laboratory be 4,000 square feet.

To determine if the industrial arts programs that were being

taught in the Indian schools at the time of the study were adequately meeting the needs of the Native learner, question 25 asked the following:

> To what extent is the industrial arts program in your school adequate for the needs of the Indian learners. (Check the appropriate response)
>
> Highly inadequate ☐
>
> Somewhat inadequate ☐
>
> Barely adequate ☐
>
> Slightly more than adequate ☐
>
> Much more than adequate ☐

The data generated by this question are presented in Table 27.

Table 27

Adequacy of Industrial Arts Program

for Native Students

Taught by Participants

Number of Participants	Highly inadequate	Somewhat inadequate	Barely adequate	Slightly more than adequate	Much more than adequate
1	X				
6		X			
3			X		
3				X	
1[a]					
Total 14					

[a]No response by participant.

An analysis of data in Table 27 show that only 3/14 of the participants in the study considered the industrial arts program they

taught to be slightly more than adequate. An implication from these data is that approximately 14 percent of the study participants believe that the industrial arts program that they are teaching to the Native learner is adequately meeting the needs of these learners. There were three participants who felt that the industrial arts program they taught to Native learners was barely adequate for the needs of these learners. Six participants reported the industrial arts program they taught was somewhat inadequate for the needs of the Indian student. Only one participant indicated that the program in industrial arts in his school was highly inadequate for the Native learner. One participant did not reply to this question.

In addition, these data show that approximately 71 percent of the participants (10/14) were of the opinion that the industrial arts program they were teaching was not meeting the needs of the Indian learner. One of the reasons why this opinion was held is that approximately 58 percent of the participants who teach industrial arts in Native schools do not have any technical background or expertise required to teach the activities that comprise a program of studies in industrial arts.

Chapter 5

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The first chapter of this report presented an overview of the problem under investigation and included all the phases of the research design. That chapter also included a list of definitions of the terms that were used throughout this report. Chapter 2 presented a review of the literature and research related to this study and was divided into three sections. The first section of the second chapter gave a review of the literature on the past patterns of Indian education to determine what authors had written on Indian education. The second section was a review of the textbooks written by specialists in the field of curriculum design and curriculum development to identify what these authorities had written on the major components of a curriculum. The third section of Chapter 2 was devoted to establishing what the major components should be for an industrial arts curriculum model. In Chapter 3 the data collected with questions from the first two categories of the research instrument were placed in tabular form and analysed. In Chapter 4 the data collected with questions from the remaining three categories of the questionnaire were tabulated and analysed.

The final chapter of the report is divided into the following three sections: a summary of the research, research findings and conclusions of the study, and a recommended model for a program of studies of industrial arts for Indian education.

Purpose of the Study

The purpose of this study was to design a model for a program of

studies in industrial arts that could be used in Indian education for the purpose of making the Native learner aware of the technical society in which the learner lives.

In addition to the major purpose of the study two supporting objectives were also established. These objectives were to determine the tools (machine and hand), the materials and the processes that should be part of an industrial arts program in Native schools.

Population and Sample

Teachers who were teaching in Native schools in each of the provinces and in each of the territories made up the population for this study. From this population a stratified sample was taken that included only those teachers who taught industrial arts. This sample included 33 industrial arts teachers.

Research Questionnaire

A library research of standard references used to design research instruments was made. From the results of this search a decision was made to use a questionnaire to collect data for the study. The research instrument was modelled after the instruments used by Schmidt (1966) and Dunne (1976) in their studies. In its final form the research instrument had 25 questions which were divided into two major categories--background information and instructional organization. Each of these categories was divided into subcategories.

Prior to being used in the Pilot Study the research questionnaire was reviewed by a specialist in instrument design of the Department of Educational Psychology, Faculty of Education, The University of Alberta.

The results of this review required modifications to be made to the research instrument.

In the major investigation the revised questionnaire was mailed to 33 participants. Fifteen of these participants, or 45.4 percent, returned a completed questionnaire. To increase the rate of return a follow-up procedure was used. This procedure is described briefly in the methodology section of this summary.

Pilot Study

To pretest the research instrument before it was used in the major investigation a pilot study was conducted. The pilot study had the following purposes: to determine if each statement on the research instrument was properly and adequately worded; to determine if questions on the questionnaire were properly sequenced; to determine if questions on the instrument would yield data for the study; and to determine the amount of time it would take a participant to complete all the questions of the instrument.

This phase of the research involved an industrial arts teacher who taught in a Native school. This teacher was also included in the major study because of the limited number of teachers teaching industrial arts in schools for Indian children. This industrial arts teacher was used for this phase of the research because of his availability, his knowledge of industrial arts and his knowledge of the study.

Methodology

A list of Indian schools located on Indian reserves across Canada, where a program of industrial arts was offered, was obtained

from an official of the Department of Indian Affairs and Northern Development, Indian Affairs Branch. The Regional Director of each region gave the researcher permission to contact principals of schools in each region where industrial arts was taught.

A copy of the research instrument together with a covering letter was sent to each principal. This letter asked for their cooperation in the study by involving the industrial arts teacher of the school, who was to complete the questionnaire.

Of the 33 instruments that were mailed, 15 were returned. A follow-up letter was designed and mailed to the 18 participants who were delinquent in returning their instruments. This procedure yielded an additional nine instruments for a total of 24 instruments, or a percentage return of 72.7 percent. Of these 24 instruments only 14 instruments were usable for the study. The other 10 instruments could not be used and were eliminated from the study for the following reasons: five schools had suspended their industrial arts program because of a school building program; four schools no longer offered industrial arts as a course of study for the Native learner, and one school had to suspend its industrial arts program when the industrial arts teacher resigned.

The data collected with the research questionnaire were placed in tabular form and analysed in Chapters 3 and 4 of this report. A summary of these findings is presented in the following section.

RESEARCH FINDINGS

Instructional Background Information

From the research it was found that of the 14 participants who taught industrial arts in an Indian school, approximately 93 percent

(13/14), earned a baccalaureate. Of these 13 participants, 8 participants, or approximately 57 percent, held a bachelor of education degree. Only 6 of the 14 participants had any technical training, and of those six participants only two had technical training in more than one area of specialization, that is, those areas of technical specialization that are a part of an industrial arts program. Although 50 percent of the participants (7/14) had six or more years experience in teaching industrial arts, the collected data did not indicate how long these teachers had been teaching industrial arts to Native students. This could be partly attributed to a weakness of question 5 of the questionnaire which did not ask for this kind of information.

Instructional Program

It was found that of the 14 schools involved in the study only four of these schools (approximately 28 percent) had a program of industrial arts for Indian students that was in existence for six or more years. The majority of these schools, approximately 78 percent, (10/14) had an industrial arts program from one to five years. These data show the recency of industrial arts programs that were offered to Native students in the schools that participated in this research.

Class periods for instruction in industrial arts in seven out of the 14 schools (50 percent) ranged from 4 periods to 6 periods per day. In approximately 36 percent of the schools (5/14) industrial arts teachers had class periods that ranged from 1 period to 3 periods per day. On a weekly basis, these class periods range from a minimum of 1 to 5 periods per week to a maximum of over 35 periods, with an average ranging

between 16 periods to 25 class periods of industrial arts per week. It could be concluded from these data that these teachers had other teaching assignments besides teaching industrial arts.

The length of time allotted for class periods in industrial arts varied from school to school. At one extreme of this range was a class period that was 31 minutes in length and at the other extreme was a class period that was 90 minutes in length. There were two participants who had class periods in industrial arts that were a maximum of 150 minutes. It might be concluded that these class periods were either double periods that were taught on a weekly basis or these schools were offering industrial arts on an ad hoc basis and fitting it into the school program wherever the industrial arts class would fit.

The percentage of time that was devoted to teaching the theoretical aspects and the practical aspects of industrial arts also showed a wide range. The range was from 100 percent of teacher's time spent teaching the practical with no theory, to 50 percent of the teacher's time equally divided between teaching both the practical and the theoretical component of industrial arts. The average amount of time that a teacher taught theory was 20 percent with the remaining 80 percent of the time spent teaching the practical aspects of industrial arts.

Class size for industrial arts varied between 11 and 15 students in 9 of the schools where participants taught. In 3 other schools class enrolment for industrial was between 1 and 10 students. In two schools class enrolments were between 16 and 20 students and 21 and 25 students respectively. Both of these class enrolments far exceed the recommended class enrolment of 15 students per industrial arts class.

To assist the participants of the study to direct and to help them organize course content, approximately 71 percent (10/14) used an industrial arts curriculum guide. Eight out of these 10 participants indicated that the curriculum guides they were using were developed by the provincial department of education in the province where the school was located. The territorial government was responsible for developing the curriculum guides used by the remaining two teachers. Of the curriculum guides that were used only four were related to the curriculum guides used with academic subjects in these four schools.

Program Objectives

From the data presented in Table 16 it was found that 14 participants involved in the study ranked the development of skills in the use of tools and machines as the first objective, and the development of creative technical talents as well as all-round technical knowledge and skill were given an equal rank of 2.5. From the various ranking of the program objectives listed in Table 16, it could be concluded that the majority of those teachers teaching industrial arts to Native students view industrial arts as a skill-developing program rather than an exploratory experience which exposes the Native learner to the tools, machines, and materials used with industrial processes.

Funding

For approximately 71 percent (10/14) of the participating schools the funding for the industrial arts program was supported by monies from the federal government, while three schools received funding from the territorial government to support their industrial arts program.

One school did not identify its source of funding.

For the majority of the participating schools, funds for industrial arts were considered to be indadequate.

Organizational Pattern

The type of industrial arts facilities in approximately 50 percent (6/14) of the participating schools was a unit shop. In four of these schools the type of facility for industrial arts was a general shop, and a multiple-activity type of facility was found in the other three schools.

In 5 of the participants' schools the only activity they taught in industrial arts was woodwork. There were 5 participants who only taught two of the activities in industrial arts. Of these 5 participants, 3 taught woodwork and materials, 1 participant taught woodwork and technologies and the other participant taught woodwork and arts and crafts. One participant taught three of the four activities listed in Table 20, and 2 participants taught all four activities found in that table.

Less than 50 percent of the participants (5/14) taught materials as an industrial arts activity and of the 5 teachers teaching materials, all 5 devoted a major portion of their time teaching woodwork, while 4 of these teachers devoted a lesser amount of time to teaching metals. From the various rankings presented in Table 21 of the materials listed, it was concluded that the time devoted by participants to teaching other materials besides woodworking was limited.

It was found from the study that in the area of visual communications, approximately 50 percent (6/14) of the study participants taught only drafting as an instructional activity. There were 3 participants

who taught drafting as well as black and white photography, while only 1 participant taught drafting, silkscreen, black and white photograph and letterpress. There were 8 participants who did not include visual communications as part of their industrial arts program.

Power technology was not included in the industrial arts program in 6 of the participants' schools (approximately 50 percent). Of the remaining 8 participants involved in the study, 4 participants taught only one activity in power technology. Of these 4 participants, 3 taught power mechanics and 1 taught electricity. There were three participants who taught three areas in power technology. These areas were power mechanics, electricity, and electronics (2 participants) and power mechanics, electricity, and hydraulics (1 participant). Only one participant involved in the study taught all of the six activities listed in Table 23 in power technology which included, power mechanics, electricity, electronics, hydraulics, fluids, and mechanical testing.

It was found of the capital equipment that was in existence in the industrial arts facilities of the participating schools that 13/14 of these schools (approximately 91 percent) had the major pieces of woodworking equipment. All of the 13 schools had a circular saw. In 8 of the 13 schools was a band saw, a jointer, and a wood lathe. A jig saw was found in 7 schools and in 6 other schools was found a radial arm saw. Only 3 schools had a shaper.

The capital equipment for metals was limited. Only 1 of the participating schools had all the capital equipment for metals listed. They included: a drill press, a floor model as well as a bench model; a milling machine, horizontal and vertical; a bending jig; a metal lathe;

and a tool grinder. There were 5 schools that had no equipment with which to work metals. Five other schools had only a floor model drill press and a tool grinder, while one school had a floor model drill press and a metal lathe. The remaining two schools involved in the study had a floor model drill press, a bending jig, and a tool grinder.

Capital equipment used to work sheet metal was found in only 50 percent (7/14) of the participating schools. It was found that 5 of the 7 schools had a break box and pan and a stake plate. In 4 of these schools the following pieces of equipment were found: forming rolls; bender-metal former; and a spot welder. Stakes were found in 3 schools and squaring shears were found in 2 schools. Only 1 participating school had a notcher to work sheet metals.

Ceramic capital equipment was limited or non-existent. There was no ceramic equipment found in 7 of the 14 participating schools (50 percent). Only 1 school had four pieces of ceramic equipment which included: a kiln; a pottery wheel; a pug mill; and modelling tools, while another 2 schools had only a kiln and a pottery wheel. Only a kiln was found in the remaining two schools.

The capital equipment used to work plastic materials was non-existent in 11 of the 14 participating schools. In the remaining 3 schools this equipment was minimal. For instance, one school had only a vacuum and blow forming unit, an electric oven and a welding torch. An electric oven and a welding torch were found in another school. In the remaining school a laminating press was found.

There was no photography equipment found in the industrial arts facilities of the 8 schools involved in the study (approximately 57

percent). In the remaining 7 schools this equipment was limited. Only 2 schools had all the equipment listed in Table 24(F) for photography but this equipment was limited to black and white film only. This equipment included: a black and white enlarger; a black and white contact printer; an electric dryer; and a 35 mm camera. A black and white enlarger together with a TV camera and its ancillary equipment were found in one participating school. In another school a black and white enlarger and a medium press format was found to be the photography capital equipment. In one school an enlarger for black and white as well as colour was found but this equipment, although found in industrial arts, was not used by industrial arts students.

Capital equipment used in graphic communications listed in Table 24(G) was not found in 13 of the 14 participating schools (approximately 93 percent). In one school the only piece of equipment used with graphic communications was a power paper cutter.

Power testing equipment was not found in 9 of the 14 participating schools (approximately 64 percent). Only 1 school involved in the study had four of the five pieces of power testing equipment listed in Table 24(H). This equipment included: a compression tester; a complete small engine station; a spark plug cleaner and tester; and a scope-ignition simulator. A compression tester, a complete small engine station, and a spark plug cleaner and tester were found in another school. Three schools involved in the study had only a spark plug cleaner and tester as part of its power testing capital equipment.

In only 3 of the schools involved in the study was lapidary equipment found. Two of these 3 schools had all the equipment listed on

the research instrument. This equipment included: a tumbler, a grinding and polishing wheel; a diamond trimsaw; and a lapping machine. The other school had only a tumbler and a grinding and polishing wheel.

The ancillary space that forms an integral part of an industrial arts facility such as a reading room, a reference library, a welding booth, a motor test room, and a paint room were found to vary from school to school. There were 3 schools who did not have any of the facilities listed in Table 24(I). In 8 of the remaining 11 schools a paint room was found. A reference library was found in 7 schools and a welding booth was located in 5 schools. In 3 schools there was a reading room, and a motor room was found in only 2 schools.

The physical size of the industrial arts facilities in the 14 participating schools varied from 1,000 square feet to over 2,400 square feet. The physical size of the industrial arts facilities of 4 of these schools ranged from 1,000 square feet to 1,200 square feet. In 3 schools the size of the industrial arts facility ranged from 1,600 square feet to 1,800 square feet. In 3 other schools the size of the industrial arts facilities ranged between 2,200 square feet and 2,400 square feet. There were 3 schools in which the size of the industrial arts facilities was 2,400 square feet or more.

The results of this study show that approximately 57 percent of the participants (8/14) did not have any technical training or expertise that is required if one is to teach the activities that make up an industrial arts program. This lack of skill background may be partly the cause why 71 percent of the teachers (10/14) involved in the study considered the program they taught in industrial arts was not meeting the

needs of the Native learner.

RESEARCH CONCLUSIONS

The following conclusions are based on the findings of this study.

1. The teachers who are teaching industrial arts to Native learners enrolled in Native schools were not adequately trained to teach this program. Of the 14 participants involved in the study less than 15 percent could be considered to be adequately qualified to teach industrial arts to Native students or to teach this program in a school in the predominant society.

2. Learning activities in several of the industrial arts facilities of participating schools were limited in scope because of inadequate space as well as a limited number of power tools that are essential for teaching the learning activities associated with industrial arts.

3. According to the research findings the majority of the industrial arts facilities that were involved in the study were poorly equipped for presenting a program of industrial arts that is interesting and challenging to the learner.

4. In many of the schools that were involved in the study, the industrial arts program was considered limited because of the funds that were provided. Because of the lack of funds many study participants considered their program as inadequate. It is possible that funds that were designated for industrial arts were channelled into other programs.

5. The majority of industrial arts teachers in Native schools considered the program they taught as not meeting the needs of the Native learner.

6. Although the model in the form of the paradigm that was developed for industrial arts was designed specifically for Native learners who attend school on an Indian reserve, the model can be used with industrial arts programs in any school, regardless of its location.

RECOMMENDATIONS

The following recommendations are a result of the research findings and are made to the designated groups for their consideration.

Recommendations for the Department of Indian Affairs and Northern Development, Indian Affairs Branch

These findings and conclusions suggest that a reassessment be made of the industrial arts programs that are being taught in Indian schools across Canada. As a guide to this reassessment, the following recommendations are made:

1. That all teachers who are employed or who will be employed to teach industrial arts in Indian schools be required to have completed course work in industrial arts as part of their university preparation so that these teachers are properly prepared to teach industrial arts.

2. That the industrial arts facilities found in the Indian schools across Canada be reorganized as multiple activity laboratories where a minimum of three materials or technologies or a combination of both are taught concurrently.

3. That the physical size of the industrial arts facility for the multiple activity organizational pattern have a minimum size of 2,400 square feet with the configuration of this facility left to the architect in concert with the industrial arts teaching staff.

4. That each area of the multiple activity laboratories be properly and adequately equipped in each of the six instructional areas, that is, three materials and three technologies. Unless each of these instructional areas is well equipped with hand tools and power tools, it is impossible for an industrial arts teacher to present a program that is interesting and challenging to the learner.

5. That sufficient funds be made available by the federal government for industrial arts and the funds that are allocated be realistic in terms of the inflationary spiral.

6. That the administrators of the Indian Affairs Branch recognize the fact that the objectives of industrial arts are not based on skill development, per se, and that industrial arts is not a form of pseudo-vocational education. Industrial arts is used to provide the student with an exposure to the multiplicity of occupations found in the productive society and the tools, materials, and processes used to provide goods and services to the members of that society. The objectives of industrial arts are not vocationally oriented.

Recommendations for Teachers Teaching Industrial Arts in Indian Schools

The following recommendations are the result of the findings of this study relating to the teachers who teach industrial arts to Native students and from the conclusions that were made.

1. That teachers, teaching industrial arts to Indian students, who have not completed industrial arts courses at a university, enroll in a university which offers courses for industrial arts teachers to upgrade their skill base.

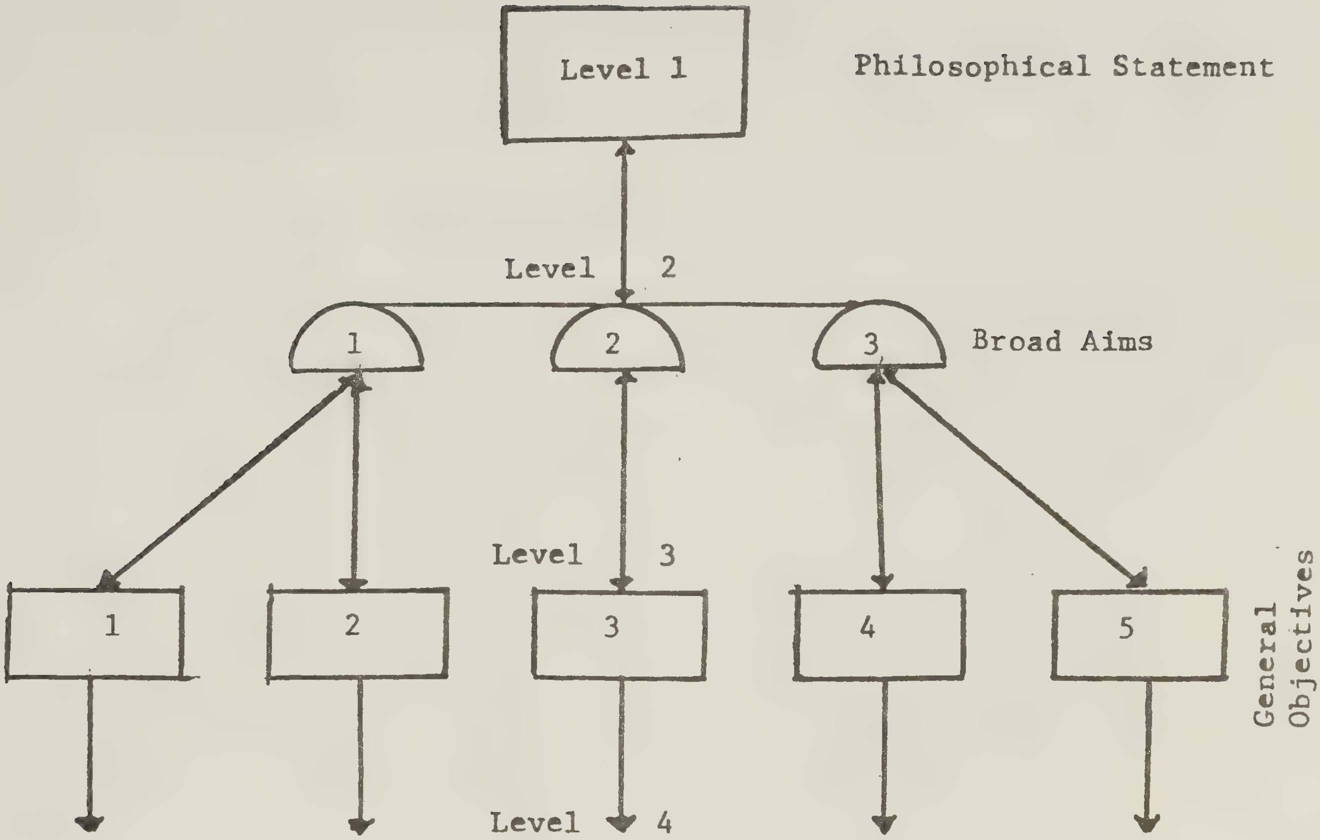
2. That all teachers currently teaching industrial arts in either a unit shop or general shop consider ways to convert their shop from its current organizational pattern to a multiple activity.

The Recommendation for the Model

On the basis of the research findings and the conclusions drawn from these findings, the following model for a program of industrial arts, for Indian education, is recommended. This model is based upon a synthesis of the writings of major authorities in curriculum design and curriculum development and because of the multiplicity of occupations found in the *Canadian Classification and Dictionary of Occupations*. Also, because of an increase in the number of tools, machines, processes, and technologies found in an ever-changing productive society, it is recommended that the organizational pattern for this industrial arts model be the MULTIPLE ACTIVITY.

The Paradigm

The paradigm is divided into three major parts which are interrelated and supportive of the other. The major parts of the paradigm are: the philosophical statement which gives the proposed program its base; the goal statements which provide the program with its direction; and the general objectives which help to identify the instructional content to be taught and how this content is to be organized.



Specific Objectives and Appropriate Activities
Figure 1

Statement of the Philosophy - Level 1 of the Paradigm

From a synthesis of the literature written by authorities on the components of a curriculum and the comments on the education of the Indian made by noted Indian leaders in their writings, the following philosophical statement for industrial arts relative to Indian education was formulated:

> To create in the Indian learner a self concept of the good life that the Indian society can provide and which will reinforce the development of the learner's potential as an individual regardless of the capabilities of the learner.

To provide the Indian learner with an education to learn the basic psychomotor skills at the use level of skill so that the learner can build on this skill base and become independent and self-sufficient and be able to function in both the Indian and non-Indian society without conflict.

Broad Aims - Level 2 of the Paradigm

From a review of the literature devoted to curriculum design and curriculum development as well as the research findings of this study, the following broad aims for industrial arts in Indian education were formulated:

To provide the Native student with learning experiences that will enable the learner to comprehend the technical society in which he lives.

To develop in the student a respect for technology that will enable the Native learner to become a productive member of either the Indian or non-Indian community.

To reinforce the Native learner's self-identity as an Indian in terms of the learner's Indian heritage, culture and values.

To reinforce the Native learner's potential as an individual so as to be able to function in both the Indian and non-Indian society without difficulty.

General Objectives - Level 3 of the Paradigm

The general objectives for an industrial arts program for the Indian learner were formulated from the results of this study:

To assist the learner to develop insights and understandings of the principles and problems related to technology and its place in Canadian culture.

To create in the learner an appreciation for, and an interest in, the industrial processes that are used to produce the goods and services to satisfy the human needs.

To provide the learner with the opportunity to develop use level psychomotor skills that may be applied in occupational situations as well as in recreational or in cultural endeavours.

To provide an environment where the learner can reinforce concepts found in the academic disciplines.

To provide the learner with initial information on the multiplicity of occupations that are found in the world of work in Canada.

The specific objectives that will direct the daily learning activities of the learner are to be developed by the teacher. These objectives will give direction to both the learner and the teacher as they both become involved with the learning and teaching activities associated with industrial arts.

The physical configuration of the industrial arts facility, together with the placement of the equipment in each of the areas, is to be determined by the industrial arts teacher in concert with other support personnel. Furniture requirements are also left to the discretion of the industrial arts teacher who should be a specialist.

The materials and technologies that are recommended for inclusion in the industrial arts program for Native students are:

MATERIALS - WOODS
- PLASTICS
- METALS

WOODS i recommended as material because the tools and equipment used in woodworking were found in 13 out of the 14 schools that participated in the study. Consequently, the funds needed to procure additional equipment to work with wood would be kept to a minimum.

In this modern day and age PLASTICS is playing a major role in the manufacturing process of the many products used in today's society. It was for this reason that plastics as material to be taught in the multiple activity laboratory is recommended as one of the three materials.

METALS as a material is recommended because equipment used to work metals was found in 50 percent of the schools participating in the study. Capital funds needed to purchase metals equipment for those schools where this equipment was not found as well as to upgrade the equipment in the other schools, would be kept to a minimum.

TECHNOLOGIES - PHOTOGRAPHY

- POWER MECHANICS

- ELECTRONICS

PHOTOGRAPHY is recommended as one of the technologies to be taught because the amount of space required to teach photography is relatively small and when compared to other industrial arts activities, capital equipment is not considered to be expensive.

POWER MECHANICS is recommended as another technology because of the importance of the internal combustion engine in modern transportation and because of its use in other sectors of the economy.

ELECTRONICS because of its continued growth in the communications, manufacturing, and entertainment industries, is recommended as the third technology for the industrial arts program for the Native learner.

A paint room should be one of the essential features of any industrial arts facility so that the fumes of finishing materials and their thinners are confined to one area, to keep the dust off the product that is being finished, as well as for the safety of the students.

For the purpose of student safety as well as a fire protection aid, a welding booth is recommended if welding is to be included as a learning activity in the metals area of the multiple activity laboratory.

A reference library, where both printed and non-printed instructional materials are housed, and a reading room are recommended as a location where students can do research or individual study projects on the tools, equipment, materials and processes they will be working with.

The tools and equipment that are recommended for each material area were selected to be used with from four to six students. The recommended tools and equipment are categorized according to the following pattern: capital equipment, power portable equipment; and hand tools. These items of capital equipment are each listed under a material or under a technology.

WOODS

Capital Equipment

Circular saw - 10"
Radial arm saw - 10"
Band saw - 18"
Jointer - 8"
Lathe
Jig saw
Bench grinder

Power Hand Tools

Sabre saw
Belt sander
Electric drill - 1/4"

Hand Tools

1 awl - scratch
1 auger bit set - ¼"-1"
2 marking gauges
4 hammers - curve claw
2 putty knives
1 spirit level - 24"
1 hardwood mallet
1 rubber mallet
1 mitre box with saw
1 oil stone (carborandum - coarse & fine)
1 oil can
1 plane 8" - smoothing
1 plane 6" - block
1 screwdriver - 3" (standard)
2 screwdriver - 6" (standard)
1 screwdriver - 10" (standard)
1 Robertson screwdriver set
2 squares - framing - 24"
2 squares - try - 6"
1 square - combination - 12"
1 sliding T-bevel
3 two-station woodworking bench complete with wood vises
2 rules - steel 12"
1 set drill bits 1/8"-1/2"
1 tape - 10'
1 set wood chisels 1/4"-1"

Woods - Hand Tools (contd)

- 2 plane 14" - jack
- 1 plane 20" - jointer
- 1 plane, rabbet
- 2 saws - back 12"
- 1 pliers - combination 8"
- 1 set surform tools
- 2 bit brace - 10"
- 1 saw, keyhole
- 1 saw - rip 5 pt
- 1 saw - crosscut
- 1 scissors
- 2 scrapers 3" & 5"
- 12 "C" clamps - various sizes
- 12 bar clamps - various sizes
- 12 parallel clamps - various sizes
- 1 spoke shave
- 1 file surform
- 1 pocket surform
- 1 countersink - rosebud

PLASTICS

Capital Equipment

- Laminating Press
- Mold-expandable head
- Buffing & polishing unit
- Vacuum & blow forming units
- Compression Molder
- Scale to determine mass
- Strip heater
- Electric oven
- Injection press
- Rotational molder
- Air compressor
- Welding torch

Hand Tools

- 1 pr scissors
- 1 side cutters
- 1 combination pliers
- 1 set Robertson screwdrivers
- 2 combination squares 12"
- 1 set Allen wrenches
- 1 hack saw
- 1 crescent wrench - 6"
- 1 push-pull drill
- 1 square - framing 24"
- 1 double-cut file
- 2 bench rules 12"
- 1 needlenose pliers
- 1 linesman pliers
- 1 set Philips screwdrivers
- 1 ball pein hammer 4 oz.
- 1 back saw
- 1 pr tin snips
- 2 brad awls
- 1 outside calipers
- 2 round files - bastard 10"
- 1 double-cut file half-moon

METALS

Capital Equipment

- Break pan and box
- Notcher
- Forming rolls
- Rotary machine combination
- Metal lathe
- Milling machine
- Stakes
- Stake plate
- Bender-metal former
- Drill press - floor model
- Grinder - bench
- Metal shaper

Hand Tools

- 1 calipers inside - 6"
- 1 calipers outside - 6"
- 1 calipers hermophrodie - 6"
- 2 micrometers 1" size
- 1 chisel, cold
- 1 countersink - 82 degrees straight shank
- 1 divider - 6"
- 1 set of drills 1/16"-1/2"
- 2 files - straight cut - 6"
- 2 files - single cut - triangle - 8"
- 16 file handles
- 1 hammer - soft face
- 2 oil cans
- 2 centre punches
- 1 aviation snips
- 3 steel rulers - 6"
- 3 scribers (steel)
- 1 square - combination 12"
- 1 set Allen wrenches 3/32-6/16"
- 1 anvil - 50 lbs
- 2 machinists vise 4-1/2"
- 2 hacksaws
- 2 files - double-cut - bastard 10"
- 4 files - single-cut - 10"
- 2 files - single cut - half round
- 2 hammers - ball pein - 12 oz
- 1 hand tap - set of tap & dies No. machine screw up to 1/2"
- 3 prick punches
- 1 set tin snips

PHOTOGRAPHY (BLACK & WHITE)

Capital Equipment

- Enlarger
- Contact printer
- Flash unit
- Electric print dryer
- Camera 35 mm
- Light meter

Dark Room Equipment

- 1 bulk film loader 35 mm
- 2 filmstands developing
- 1 32 oz graduate
- 1 darkroom timer
- 1 thermometer
- 2 doz film clips
- 2 sponges
- 2 squeegees
- 1 print washer
- 4 developing trays 8"x10"
- 4 development tanks 11"x14"
- 6 print tongs
- 1 paper cutter
- 1 set filters for enlarger
- 1 film & lens brush
- 2 funnels

ELECTRONICS

Capital Equipment

- 3 Experiment Kits
- 2 Power supplies used with above kits
- 2 Multimeters

Hand Tools

1	combination pliers	2	long nosed pliers
2	side cutter 5"	1	lineman's pliers
1	soldering gun with extra tips	1	soldering iron - removable tips
1	roll solder 40/60	1	can flux
2	rolls hook-up wire	1	wire stripper
2	screwdrivers 6"	1	roll electric tape

POWER MECHANICS

Capital Equipment

Small engine station complete
Compression tester
Spark plug tester & cleaner

Hand Tools

3	spark plug gauges	2	No. 4 engine stand
2	reamers	1	tachometer
1	bushing driver	1	torque wrench
1	set feeler gauge	1	adapter 3/8" to 1/2"
1	set Allen wrenches	1	screwdriver 8"
1	socket driver	1	mechanics pliers
1	socket 1/4"	2	ignition files
1	oil plunger reamer	1	7-pc spark plug gapping tool
1	flywheel pullers	1	bushing reamer
1	piston ring compresser	2	jet screwdrivers
1	clutch wrench	1	valve spring compresser
1	socket 5/16"	14	combination wrenches - 1/4" to 1-1/16"
1	pipe wrench		
1	13-pc socket set	1	4 oz ball pein hammer
1	1-1/8" socket	1	Philips screwdriver set
1	1" socket	1	all purpose pliers - 9½"
1	13/16" socket	1	Service Manual

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APPENDIX A

This appendix includes a sample of the letter that was sent to Dr. E.R. Daniels, Chief, Education and Cultural Development Branch, Department of Indian Affairs and Northern Development, Indian Affairs Branch, Ottawa, Ontario.

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678

QUAECUMQUE VERA

THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G 0Y1

August 30, 1976

Dr. E. R. Daniels
Chief, Education and Cultural
Development Branch
Department of Indian Affairs
400 Laurier West
Ottawa, Ontario

Dear Dr. Daniels,

You may recall that this past spring when you were at Hobbema we talked about the thesis topic I intend to research. The topic of this research towards my Master's degree is, "A Model for the Role of Industrial Arts in Indian Education".

Presently I am at the stage of my research where I am getting ready to contact the principals of Indian schools that offer a program of industrial arts in their schools.

I would like you to cooperate in the research by providing me with a list of principals of Indian schools in Canada that offer a program of studies in industrial arts. I will use this list to identify the Indian schools that I must contact in the data collection phase of my study.

Thank you for your cooperation.

Yours truly,

Robert van't Hoff
Graduate Student
Department of Industrial
and Vocational Education

APPENDIX B

In this appendix is a sample copy of the letter that was sent to the Regional Directors across Canada of the Department of Indian Affairs and Northern Development.

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678

QUAECUMQUE VERA

THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G 0Y1

November 30, 1976

Dear

In addition to teaching industrial arts at the Hobbema Indian Reserve I am enrolled in the Master's degree program at the University of Alberta. Part of the requirements for this degree calls for the completion of a Master's thesis. The topic of my thesis is, "A Model for the Role of Industrial Arts in Indian Education".

The research design for this study calls for me to contact principals of Indian schools that offer a program in industrial arts in their schools. As Regional Superintendent you should know what schools in your region offer a program of studies in industrial arts. Therefore, I am asking you to cooperate in the study by providing me with a list of principals in your region who offer an industrial arts program in their school.

After I recieve your list I will contact each principal asking them to cooperate in the study by becoming involved in the data collection phase of the research.

The information that you send will be treated as privileged information and will be made available only to the researcher.

A copy of the research abstract will be made available to those who cooperate in the study.

Thank you for your cooperation.

Sincerely yours,

Robert van't Hoff

LIST OF REGIONAL DIRECTORS

Mr. W. E. Brooks P.O. Drawer 160 77 Victoria Street Amherst, N.S. B4H 3Z3	Regional Superintendent - Maritimes
Mr. A. J. Neilson 1141 Route de I'Eglise (Ste-Foy) P.O. Box 8300 Quebec, P.Q. G2Z 4C7	Regional Superintendent - Quebec
Mr. F. Kelly 55 St. Clair Ave. East Toronto, Ontario M4T 2P8	Regional Superintendent - Ontario
Mr. R. D. Brown 275 Portage Avenue (Room 1100) Winnipeg, Manitoba R3B 3A3	Regional Superintendent - Manitoba
Mr. J. Leask McCallum Hill Bldg. 1874 Scarth Street Regina, Saskatchewan S4P 2G7	Regional Superintendent - Saskatchewan
Mr. Dobson 27th Floor, C.N. Tower Edmonton, Alberta T5J 0K1	Regional Superintendent - Alberta
Mr. F. J. Walchi P.O. Box 10061 Pacific Centre Ltd. 700 West George Street Vancouver, B.C. V7Y 1C1	Regional Superintendent - British Columbia
Mr. E. Daggit Room 115, Federal Bldg. Whitehorse, Y.T. V1A 2B5	Regional Superintendent - Yukon
Mr. G. F. Kelly P.O. Box 2760 Yellowknife, N.W.T. X0E 1H0	Regional Representative Northwest Territories

APPENDIX C

This appendix contains a sample copy of the letter that was sent to industrial arts teachers who taught industrial arts in Indian schools across Canada.

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678

QUAECUMQUE VERA

THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G OY1

October 11, 1977

Dear Sir,

As an industrial arts teacher who has taught on an Indian reservation, I became interested in developing a model of industrial arts for the Native learner. Because of this interest, I have selected for my thesis topic, "A Model for the Role of Industrial Arts in Indian Education".

At the present time, I am enrolled in the Faculty of Graduate Study and Research, completing the requirements for a Master of Education degree. Part of the requirements for this degree is the completion of a master's thesis.

The purpose of this letter is to seek your cooperation in the study by completing the enclosed research instrument. To complete this instrument should take no longer than one half hour of your time. After you have completed the instrument please place it in the self-addressed, stamped envelope and return it to me by October 28.

A copy of the research abstract will be made available to those who participate in the study. All the information that you provide the researcher will be treated as privileged information.

Thank you for your cooperation.

Yours truly,

Robert van't Hoff
Graduate Student

Encl.

APPENDIX D

A sample copy of the follow-up letter that was sent to delinquent participants who were late in submitting their research instrument is found in this appendix.

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678

THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G OY1

November 18, 1977

Dear Sir,

On October 10, I sent you a letter describing a research study I am conducting as part of my Master's program at the University of Alberta.

The final outcome of this study will be a Model for the Role of Industrial Arts in Indian Education.

At this point in time I have not received your completed instrument. There is the possibility that you may have misplaced the instrument. For your convenience I have enclosed another instrument as well as a self-addressed return envelope. Because of the limited number of Native schools in Canada that offer a program of industrial arts, it is important that all schools become involved in the study, if it is to have any significance.

It would be appreciated if you would take a few minutes of your time to complete the enclosed instrument so that data analysis can take place. I would like to include the name of your school as one that cooperated in the study.

Because of the timeline that I have established for the completion of the study, could you return the completed instrument to me by Friday, December 9.

Thank you for your cooperation.

Yours truly,

Robert van't Hoff
Graduate Student

Encl.

APPENDIX E

This appendix contains a copy of the research instrument.

SURVEY OF THE INDIAN SCHOOLS IN CANADA

WHICH OFFER COURSES IN INDUSTRIAL ARTS

Participant's Name (optional) ______________________________

Title or Position ______________________________

Name of School ______________________________

Province ______________________________

Directions to Participants

Please read each question carefully and tick off the appropriate box at the right or answer the question very briefly. If the question cannot be answered or is not applicable to your particular program, then please leave it blank.

INSTRUCTOR BACKGROUND INFORMATION

1. What is the highest educational degree you have earned? (Check most applicable)

   No degree ☐

   Bachelor's ☐

   Master's ☐

   Doctorate ☐

   Other (specify) ______________________________

2. Please state degree(s), diploma(s), or certificate(s) attained and field of study.

Degree	Diploma	Certificate	Field of Study

3. Identify the type of institute of a post-secondary nature where you acquired the skills to teach your program. Please check appropriate square.

   University ☐

   Community College ☐

   Teacher's College ☐

   Technical Institute ☐

   Trade School ☐

   Trade College ☐

   Industry - at apprenticeship level ☐

   - at Master's level ☐

   Other (specify) ______________________________

4. Do you have any technical training?

   Yes ☐

   No ☐

   If YES, what technical field(s) did you specialize in? Please list.

   ____

   ____

   ____

5. Including the current year what is the total number of years of experience you have teaching industrial arts (Grades 7 - 12). (Check most applicable)

   One year ☐

   2-3 years ☐

   4-5 years ☐

   6-9 years ☐

   10 or more years ☐

INSTRUCTIONAL PROGRAM

6. How long has a program in industrial arts been in existence at your school? (Check most applicable)

One year	☐
2-3 years	☐
4-5 years	☐
6-9 years	☐
10 or more years	☐

7. How many class periods of industrial arts do you teach per day? (Check one)

1-3	☐
4-6	☐
7-8	☐
Other (specify) ______	

8. How many class periods of industrial arts to you teach per week? (Check one)

1- 5	☐	21-25	☐
6-10	☐	26-30	☐
11-15	☐	31-35	☐
16-20	☐	Over 35	☐

9. How many minutes are there in a class period that is devoted to industrial arts? (Check one)

30 minutes	☐
31-40 minutes	☐
41-50 minutes	☐
51-60 minutes	☐
61-90 minutes	☐
Other (specify) ______	

10. Please list the percentage of your overall time that is spent in your industrial arts classes.

    In teaching theory ________________

    In teaching practical ________________

11. What is the average enrolment for the industrial arts classes that you teach?

    6-10 ☐

    11-15 ☐

    16-20 ☐

    21-25 ☐

    26 or over ☐

12. Have curriculum guides been developed that are required for use in the industrial arts program in your school?

    Yes ☐

    No ☐

    If YES, where did these guides originate?

    ____

13. Were these guides developed in conjunction with the ongoing genera; academic program in your school?

    Yes ☐

    No ☐

PROGRAM OBJECTIVES

14. Below is a list of objective statements for industrial arts that are most commonly found in the professional literature. Please place these statements in rank order (1, 2, 3, etc) for those that coincide with the objective statements for the industrial arts program that you teach.

    To discover and to develop creative technical talents in students.

    To develop an understanding of Canada's technical culture.

14. (continued)

To develop in each student a measure of skill in the use of common tools and machines.

To provide pre-vocational experience of an intensified nature for those students interested in technical work.

To provide general all-around technical knowledge and skill.

To develop worthy leisure-time interests.

To develop consumer knowledge of use of industrial products.

To develop problem solving skills relating to materials and processes.

Others: Please list and rank

____

____

FUNDING

15. Is the program you teach supported by (Check most applicable)

Provincial funds? ☐

Federal funds? ☐

Other (specify) _______________________________

16. In your opinion, is your program adequately funded?

Yes ☐

No ☐

If NO, why? _______________________________

ORGANIZATIONAL PATTERN

17. Is the structure of your shop: (Check most applicable)

(a) A unit shop, that is, a shop which offers an activity in a single major field such as woodworking or metal working?

(b) A general shop, that is, a shop designed for two or more major activities carried on under the direction of one teacher?

17. (continued)

(c) A multiple activity shop, that is, a shop designed for a combination of unrelated major activities of different materials or occupations such as woodworking, drafting, metalworking, plastics etc.?

18. In the industrial arts facility where you teach check those activities that are taught:

- Woodwork ☐
- Materials ☐
- Technologies ☐
- Arts and Crafts ☐

19. If materials are taught, please rank them in the list below with respect to the amount of time devoted to each (1, 2, 3, etc).

- Woods ☐
- Plastics ☐
- Metals ☐
- Leather ☐
- Textiles ☐
- Lapidary ☐
- Other (specify) ______________________

20. Which of the following areas of Visual Communications do you teach?

- Drafting ☐
- Photography - Black and White ☐
-             - Colour ☐
- Printing - Offset ☐
-         - Letter Press ☐
- Silkscreen ☐
- Other (specify) ______________________

21. Which of the following areas of Power Technology do you teach?

- Power Mechanics ☐
- Electricity ☐
- Electronics ☐
- Hydraulics ☐
- Fluids ☐
- Mechanical Testing

22. Which of the major pieces of capital equipment is found in your industrial arts facility?

(a) Woods

- Circular Saw ☐
- Radial Arm Saw ☐
- Band Saw ☐
- Jig Saw ☐
- Jointer ☐
- Lathe ☐
- Shaper ☐

(b) Metals

- Milling Machine ☐
  - \- horizontal ☐
  - \- vertical ☐
- Drill Press - bench ☐
  - \- floor ☐
- Bending Jig ☐
- Metal Lathe ☐
- Tool Grinder ☐

(c) Sheet Metal

- Break - Box and Pan ☐
- Squaring Shear ☐
- Notcher ☐
- Forming Rolls ☐
- Rotary Machine Combination ☐
- Stakes ☐
- Stake Plate ☐
- Bender - Metal Former ☐
- Spot Welder ☐

(d) Ceramics

- Kiln ☐
- Pottery Wheel ☐
- Blunger ☐
- Pug Mill ☐
- Modelling Tool ☐

22. (continued)

(e) Plastics

Laminating Press	☐	Electric Oven	☐
Mold - Expandable Bead	☐	Injection Press	☐
Buffing & Polishing Unit	☐	Rotational Molder	☐
Vacuum & Blow Forming Unit	☐	Air Compressor	☐
Thermosetting Machine	☐	Welding Torch	☐

(f) Photography

Enlarger - Black & White	☐	Electric Dryer	☐
- Colour	☐	Cameras - 35 mm	☐
Contact Printer - Black & White	☐	- Other	________
- Colour	☐		

(g) Graphic Communications

Camera - Horizontal Process	☐	Headliner	☐
Collater - 12 Station	☐	Strip Printer	☐
Power Paper Cutter	☐	Power Jogger	☐
Paper Drill - table model	☐	Plate Exposure Unit	☐
Duplicator - Offset	☐	Typewriter - 15" carriage	☐
Electrostatic Copier & Converter	☐		

(h) Power Testing

Compression Tester	☐
Engine Analysis System	☐
Small Engine Station Complete	☐
Spark Plug Cleaner & Tester	☐
Engine Analyzer	☐
Scope-ignition Simulator	☐

22. (continued)

(i) Lapidary

Tumbler	☐	Diamond Trimsaw	☐
Grinding and Polishing Wheels	☐	Lapping Machine	☐

23. Does your industrial arts facility have the following: (Check those applicable) -

Reference library	☐	Reading room	☐
Welding booth	☐	Motor test room	☐
Instructional materials	☐	Paint room	☐
- printed	☐		
- non-printed	☐		

24. Is the industrial arts facility where you teach -

1,000 to 1,200 square feet	☐
1,300 to 1,500 square feet	☐
1,600 to 1,800 squqre feet	☐
1,900 to 2,100 square feet	☐
2,200 to 2,400 square feet	☐
More than 2,400 square feet	☐

25. To what extent is the industrial arts program in your school adequate for the needs of the Indian learners. (Check appropriate response)

Highly inadequate	☐
Somewhat inadequate	☐
Barely adequate	☐
Slightly more than adequate	☐
Much more than adequate	☐